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ABSTRACT

This World Bank (Washington, D.C.) kit is designed to teach secondary school social studies students about the Rajasthan (India) Canal Project and the impact it has had on the state of Rajasthan and its population. The kit contains a pamphlet, a booklet, a sound filmstrip, and a teacher's guide. The pamphlet, "Economic Summary: India," places the canal project in the context of India's overall development plan. The booklet, "The Rajasthan Canal Project," follows the personal story of a family living in the desert of northwest India and how their lives change when the canal system serving their land is improved. The booklet indicates how crucial agriculture and water are to a society, its culture, and its economy. The filmstrip, "What Happens When a Desert Blooms," reviews the project visually. The teacher's guide contains: (1) objectives for learning; (2) 8 lesson plans; (3) the filmstrip script; and (4) 12 reproducible student worksheets, including one test. Tables, maps, drawings, and black and white photographs are included. (JB)

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The Rajasthan Canal Project: A Case Study of Economic Development.

Toward a Better World Series, Learning Kit No. 2.

Harriet Baldwin

Bruce Ross-Larson, Ed.

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Economic Summary

India

Social or economic indicator	India	United States
Land area	3,288,000 square kilometers	9,363,000 square kilometers
Population, 1981	690,200,000	229,800,000
Projected population, 2000	1,001,000,000	259,000,000
Proportion of population in urban areas, 1981	24 percent	77 percent
Proportion of workers in agriculture, 1980	69 percent	2 percent
Proportion of population of secondary-school age that is enrolled in school, 1980	30 percent	97 percent
Proportion of adult population that is literate, 1980	36 percent	99 percent
Life expectancy at birth, 1981	52 years	75 years
Infant mortality rate, 1981	12 percent	1 percent
Persons per physician, most recent estimate	3,640 persons	520 persons
Daily supply of calories per person, 1980	1,880 calories	3,658 calories
Passenger cars per thousand persons, most recent estimate	1 car	526 cars
Per capita consumption of coal or equivalent energy, 1980	210 kilograms	11,626 kilograms
Gross national product, 1981	$179,500,000,000	$2,946,000,000,000
Gross national product per capita, 1981	$260	$12,820

In 1947, after a long struggle for independence from Great Britain, two nations were formed in the Indian subcontinent: India and Pakistan. East Pakistan became Bangladesh in 1971.

India's history goes back more than 4,000 years. It is a complex story of invasions, migrations, and the development of many traditions. Modern India is huge and varied. In population, it is the world's second largest country; in area, the world's seventh largest. More than a dozen principal languages and scores of dialects are spoken in various parts of the country. Customs, food, and clothing vary widely from place to place, frequently intermingling. Most Indians are Hindus, but there are significant numbers of Muslims, Sikhs, and Christians.

The Indian Economy

India is one of the poorest countries in the world. It has a population of more than 690 million, and about 14 million persons are added each year. The annual income of the average Indian in 1981 was $260, but a third of the population lived on $115 or less. Although millions of Indians are reasonably well off, hundreds of millions live in poor villages and urban slums. Barely able to produce enough to live, they are hungry, illiterate, in poor health, and living in crowded and poorly built houses—if they have houses at all.

India is sorely pressed to provide for is massive population, even though its resources are considerable. More than half the land can be used for agriculture. The temperature is warm enough in most places for farming to be carried on all year round, but the amount of rain varies from year to year. It comes mainly during the period of monsoon, a seasonal wind from the Arabian Sea which produces rain between June and September. When there is too little rain, widespread drought severely reduces production. When there is too much rain, severe flooding may be equally damaging.

India has many of the resources required by a modern economy. It has large reserves of coal and iron ore. In

World Bank Photo Library—Carl Purcell

addition to coal, its energy resources include oil, natural gas, and many rivers which supply hydroelectric power. New supplies of oil and natural gas have recently been discovered in the Arabian Sea, but India still depends heavily on imported oil. There are good natural harbors for international shipping. Networks of transportation and communication are good in comparison with those of most developing countries. Another important resource is a large group of well-trained scientists, technicians, administrators, and businessmen.

Modern Indian factories produce a variety of goods that are consumed in India or exported to other countries. Manufactured products range from steel and industrial machinery to cotton cloth and carpets. To support its industry, India must import a great deal of oil, such raw materials as zinc and copper, and certain kinds of

industrial machinery that it does not produce itself. To pay for these imports, India exports some of its products to other countries. But India's exports are not nearly enough to pay for the many things it needs to import.

Despite its growing industry and trade, India is primarily an agricultural country. Three out of four Indians —half a billion—live in rural areas. Most of them work as day laborers and tenant farmers and grow scarcely enough to feed their families. Some produce a surplus: cotton and vegetables; dairy products; wheat, rice, and other grains. Most farm products are consumed in India, but tea, coffee, sugar, and spices are exported.

Economic Development In India

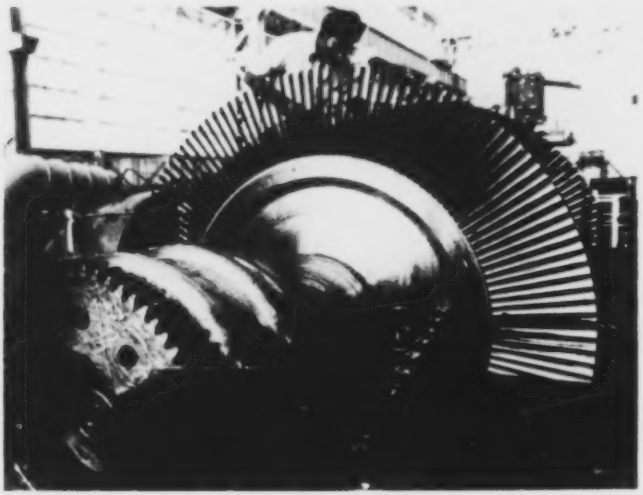
In India, as in most developing countries, the national government plays an important role in economic development. Since 1951 the Indian government has followed development plans. Recent plans have had several goals. One is to increase industrial and agricultural production, especially of food. A second is to assist the poorest Indians by providing more educational opportunities, better health services, and more jobs. A third is to develop energy resources, which will support further industrial expansion.

Most of the money to pay for India's economic development comes from the Indians themselves—from the savings of individuals, the profits of business, and the money the government receives in taxes. But to help India's development effort, the governments of developed countries, the United Nations, and the World Bank provide hundreds of millions of dollars in loans and grants to the government of India each year.

Under its successive development plans, the value of goods and services produced in India—its gross national product—has more than tripled since 1950. That growth has been achieved because of a variety of activities. A principal activity has been to increase India's stock of physical capital. Harbors have been modernized, and roads and electrical power plants have been

built. Rail and air services have been extended. There now are more radio and television facilities and better telephone and telegraph services.

In addition, many factories have been built in India's cities, and an increasing number of small-scale factories are being built in the countryside. Indian factories turn out many of the things produced in the developed countries: steel, cement, clothing, airplanes, fertilizers, medicines, aluminum, automobiles, railroad cars, electrical equipment, and industrial machinery.



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Steps have also been taken to increase agricultural production. Millions of farmers now participate in training programs to learn modern methods of planting and harvesting and the proper use of fertilizer and better seeds. Irrigation works have been improved and new ones built to provide a reliable water supply, reducing the threat of variations in the monsoon.

India now produces many things that were once imported. Because agricultural production has increased, India no longer imports foodgrains. Fertilizer once was a principal import; today, most of the fertilizer used in India is produced in Indian factories. To reduce the amount of oil it imports, India is developing its newly

United States Agency for International Development

discovered oil and natural gas reserves and using its coal resources more efficiently. A number of products are being produced specifically for export: machinery, clothing, handicrafts, and such textiles as silk and cotton. By increasing its exports, India earns more money to purchase the things it must import—oil and industrial materials and equipment.

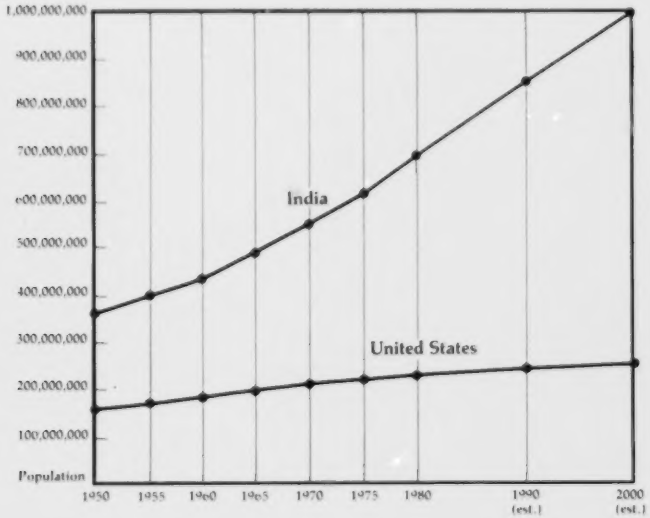
Although growth in agriculture and industry is the primary means of improving the lot of India's poorest people, additional efforts are helping them. There are more schools and adult literacy classes. Public services for water and sanitation have been improved in Indian cities and villages. Health services, including those for family planning, are more widely available. Research about slowing population growth is under way.

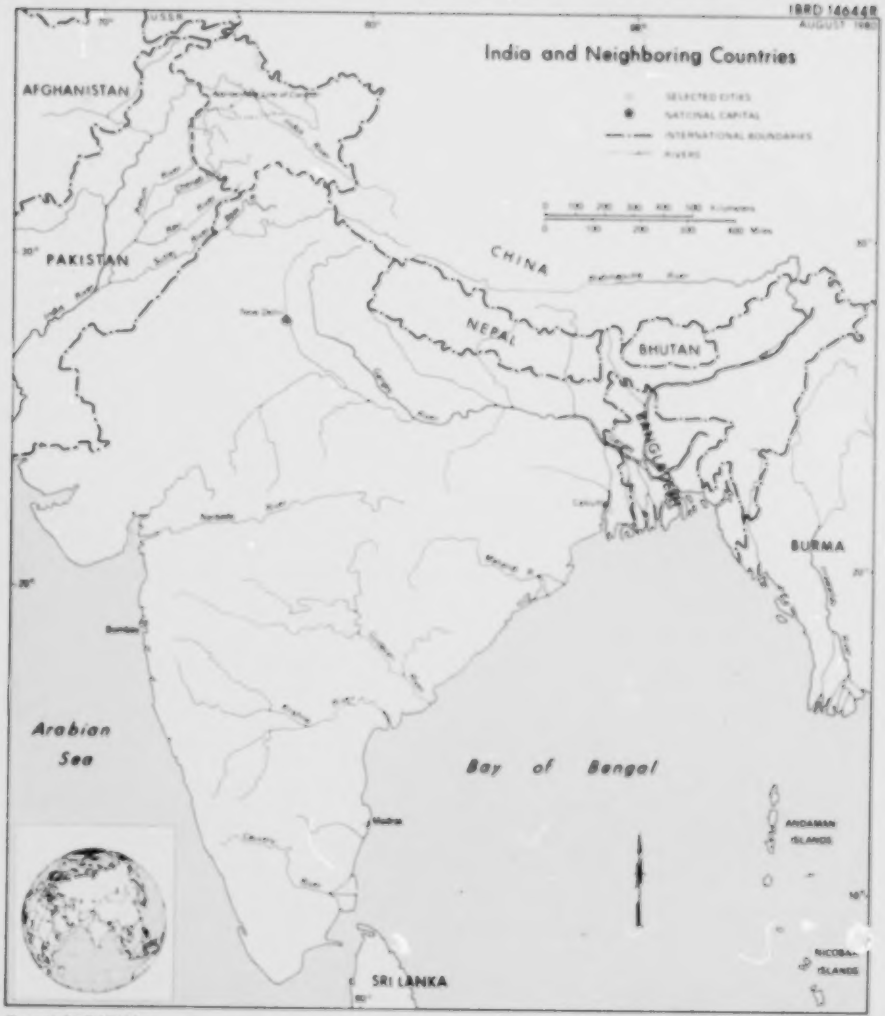
Because of all these activities, millions of Indians who once were desperately poor now have regular work in factories and on farms. Millions of farmers have more income because they are producing more.

Despite its steady economic growth, living conditions in India are improving much too slowly. Millions of Indians still are unemployed or earn too little to support a decent life. Life for most people in Indian cities still is squalid and miserable. Millions of farm families still must go hungry during much of the year. Throughout India, there are too few schools and teachers, too few hospitals and clinics, too few doctors, nurses, and other health workers.

Few countries in the world face as difficult a development task as India. There were almost 350 million more Indians in 1981 than in 1947. There will be another 300 million by 2000. Economic growth is not rapid enough to keep up with the needs of India's rapidly growing population. Stepping up the growth of the economy will require even greater effort and even more money than in the past.

Population of India and the United States for Selected Years





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The Rajasthan Canal Project

A Case Study of Economic Development

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The World Bank is an international organization owned by nearly 150 countries. Its work is to help poor countries in their efforts to improve the living conditions of their people. It does this by lending money to these countries for development projects. The International Development Association, which is part of the World Bank, makes interest-free loans to the world's poorest countries. The World Bank began to operate in 1946; the International Development Association was founded in 1960. Their loans to developing countries now amount to about $14 billion a year.

This book is part of Learning Kit No. 2 in the World Bank's series of multimedia kits about economic development, TOWARD A BETTER WORLD. Other materials in the kit are a filmstrip, an economic summary of India, and a teaching guide. Other kits in the series are listed on page 4 of the teaching guide. Harriet Baldwin is the author of this case study, Bruce Ross-Larson the editor. Ray Witlin took the photographs, which are part of the World Bank Photo Library. Carol Crosby Black designed the cover and layout. The statistics, figures, and maps were prepared at the World Bank. The views and interpretations in this book are those of the author and should not be attributed to the World Bank, to its affiliated organizations, or to any individual acting on their behalf. The denominations used in the maps and the boundaries shown do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

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Pronunciation Guide

Ranjit Singh	*Rahn*-jeet *Sing*
Sitadevi	See-tah-*day*-vee
Rivers	
Beas	Bay-*oss*
Chenab	Chuh-*nob*
Jhelum	*Jay*-lum
Indus	*In*-dus
Ravi	*Rah*-vee
Sutlej	*Sut*-ludge
Places	
Bijeynagar	Bee-*jeh*-nah-grr
Bikaner	Bee-kin-*air*
Jaipur	*Jye*-poor
Punjab	*Pun*-job
Rajasthan	*Rah*-jus-tahn
Suratgarh	Suh-rat-*gar*
Thar Desert	*Tar*
Historical Terms	
Gandhara	Gan-*dar*-uh
Guptas	*Goop*-tuz
Mauryas	*More*-yus
Moghal	*Moh*-gul
Rajputs	*Rahj*-putz

Chapter One

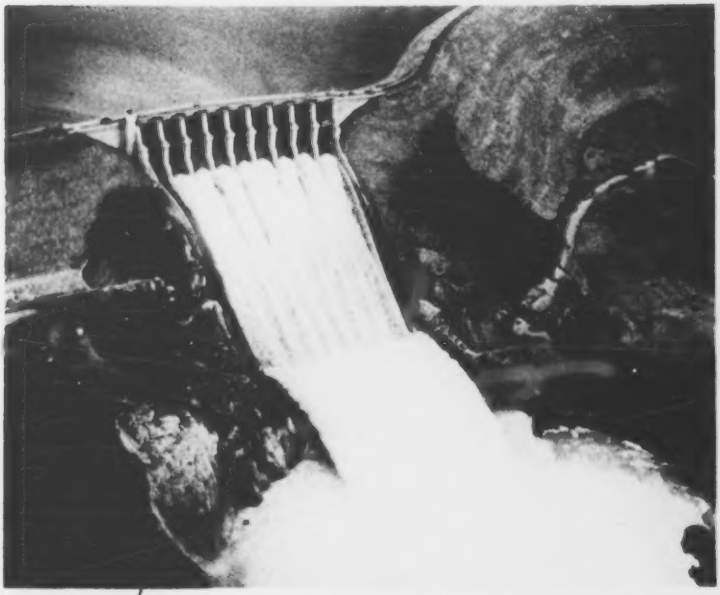
The Setting

The Thar Desert, also known as the Great Indian Desert, stretches across northwestern India and northeastern Pakistan. In good years, occasional storms bring about 25 centimeters (10 inches) of rain to some places. Usually there is much less. The summer monsoon, which carries rain to the Indian subcontinent between June and September, passes south of the desert area and often leaves it dry.

The desert landscape—with high dunes, scrub grasses, and low bushes—is bleak and barren. But when the land is irrigated, it blooms. People have been irrigating land in this part of the Indian subcontinent for thousands of years. The Indus Valley civilization, one of the great urban civilizations of antiquity, flourished here. Its people irrigated with water from the Indus River, just as the people of other ancient civilizations irrigated with water from the Nile, the Huang Ho, and the Tigris and Euphrates. From the Indus Valley, knowledge of irrigation spread to other parts of the Indian subcontinent.

The irrigated area of Thar Desert has seen many changes since ancient times. Large-scale irrigation ended

when the Indus Valley civilization declined, but irrigation works were built up again before the birth of Christ. The area was then know as Gandhara, and Greeks, Persians, and Indians mingled there for several centuries. The rulers of India's early empires—first the Mauryas, then the Guptas—were attracted by the area's wealth and made it a province. In the seventh century A.D., a ruling family called the Rajputs created a wealthy, colorful kingdom that was periodically conquered by invaders from the north and west and from elsewhere in the sub-

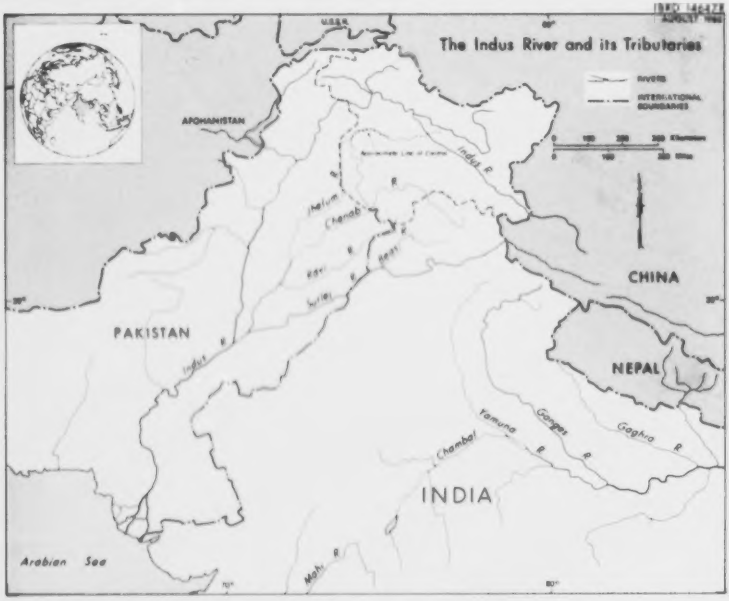


continent. During the sixteenth and seventeenth centuries, the area lay at the heart of the Moghal Empire. In the following centuries, it was part of the British Empire.

In the late nineteenth century, British engineers designed and oversaw the construction of a complex network of dams, reservoirs, and canals to control the Indus and its tributaries. Old irrigation works were improved, and thousands of square kilometers of land were irrigated for the first time. Millions of farmers and their families lived on this irrigated land. Some farmers with

extensive landholdings became wealthy; food from the area was shipped all over India.

When India and Pakistan won their independence from Great Britain in 1947, the irrigated area was divided between the two countries. The division created a serious problem because the rivers providing the irrigation water flowed through both countries. Which country would control the water? After many years of negotiations, representatives of India and Pakistan signed a treaty that allocated to India some of the waters of the upper Sutlej,



the Beas, and the Ravi—all tributaries of the Indus. New dams and waterways were built to divert the waters of these rivers to the Indian states of Rajasthan, Punjab, and Haryana.

The Indian state of Rajasthan was formed when India became independent. A third of Rajasthan lay in the Thar Desert. To the east and south of the desert were the cities where wealthy Rajput princes once maintained palaces and managed estates.

There had always been much less irrigated land in

Rajasthan than in Punjab and Haryana because it is farther from the Indus. Although farmers in the irrigated area made a good living, millions in the desert lived as people had lived there for centuries. Some were nomads, settling briefly so their camels and herds of sheep and goats could graze, moving on when the scarce vegetation was exhausted. Others lived in small villages that grew up around reliable wells. A few villages grew into market towns that brought nomads, farmers, and merchants together. Many farmers had no land; many had land which produced very little.

Rajasthan is the second largest of the Indian states; it is a little smaller than California. Because of the desert, it is not as densely populated as most other states of India. Even so, its population of 27 million people exceeds that of California by 7 million. Many Rajasthanis are tall and stately. Their colorful clothing is fashioned in a style recognized throughout India. The women wear heavy, handsome jewelry and make carpets using designs that are centuries old.

Ranjit Singh was twelve when India and Pakistan became independent in 1947. The village of his birth was in the Indian state of Rajasthan, near a small city called Bikaner. Ranjit's father and grandfather had been born in the same village. His father owned a small farm. It was not irrigated, and it produced only enough to feed the family. Often it did not produce even that, and there was no choice but to go hungry.

As a boy Ranjit worked beside his father and his brothers in his father's fields. At harvest time, he occasionally worked on neighboring farms to earn a few rupees as a day laborer. Ranjit never went to school, partly because he had to work, partly because his father could not pay the school fees or buy him school clothes.

Ranjit's father sometimes talked about leaving his land and going to the part of Rajasthan where irrigation made farming easier. But he did not have the money to buy land there, and he hated the thought of leaving the land that was his own, even though it was poor. His land and his family—these were all he had.

Ranjit married when he was fifteen. His wife, Sitadevi, was fourteen. She came to live in the house of Ranjit's parents, which is the custom in India. Their first son died soon after birth, but a year later another son was born. Ranjit built a house beside his parents' house for his new family. He made the walls with mud and sticks and roofed it with thatch from the desert. Once, in a violent wind storm, the house collapsed, and Ranjit had to rebuild it.

Two other children were born, but one of them died. Soon there was another son, and two years later a daughter, who died when she was a year old. It became more difficult for Ranjit and Sitadevi to provide for their growing family. Often they worked together in the fields while the children played nearby with sticks and stones.

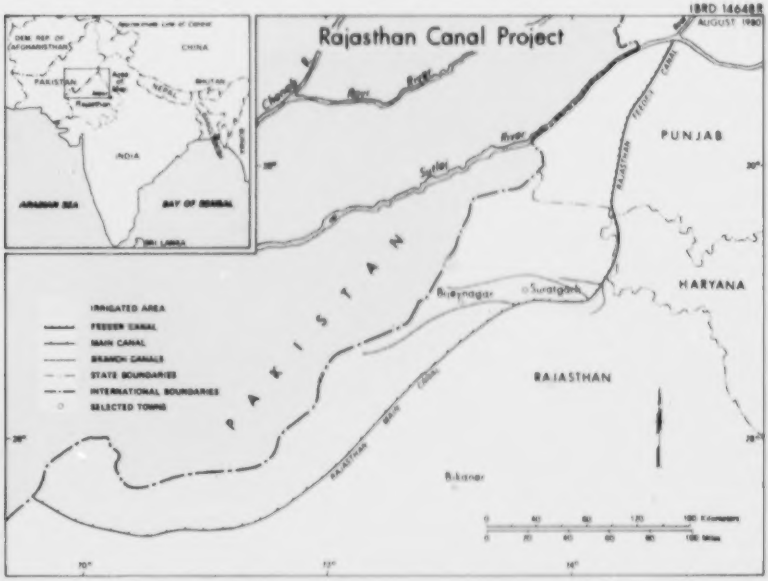
Two more children were born. Even though they worked very hard, Ranjit and Sitadevi often were hungry. Their five children were very thin and frequently ill, partly because the water in the village well was polluted. There was little money. There was only the land, and the land could not produce enough. His father's plot, once pressed to feed Ranjit and his brothers and sisters, was being pressed to feed many more.

Chapter Two

Canals for Rajasthan

In 1948 the government of Rajasthan, in cooperation with the government of India, planned a major irrigation project for the northwestern part of the state. More irrigation in this area would be beneficial for two reasons. It would create more farmland, which could be given to farmers who had no land or whose land was poor. In addition, irrigation would increase the agricultural output of the area and provide more food for India's growing population.

The state governments of Punjab and Rajasthan reached an agreement to share the water of the Sutlej River. A feeder canal was to be built to carry water from the Sutlej across Punjab to Rajasthan. No water was to be withdrawn from the feeder canal in Punjab; its only purpose was to "feed" canals in Rajasthan.

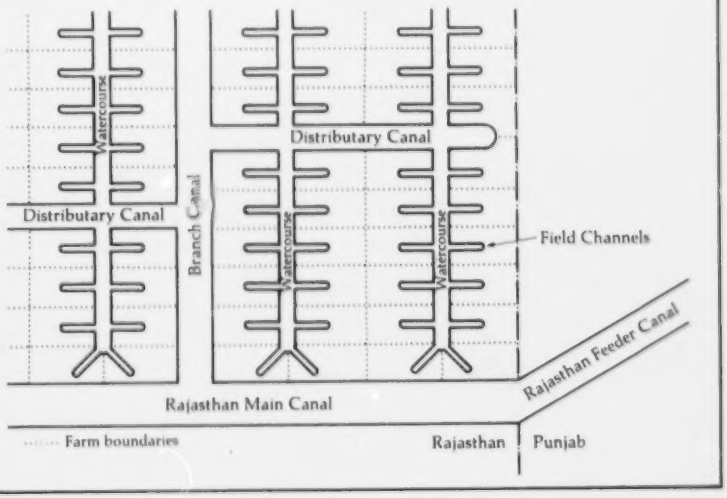


The project was called the Rajasthan Canal Project. It was to create one of the largest irrigation systems in India. The area to be irrigated was about 10,000 square kilometers (4,000 square miles), slightly less than the area of Connecticut. About 100,000 persons lived in the area to be irrigated. The government of Rajasthan estimated that 400,000 more could live in the area when the project was completed.

A complex system of canals was to be built. The *Rajasthan Feeder Canal* would carry water across Punjab into a long canal called the *Rajasthan Main Canal*. From this canal, four *branch canals* would carry water to other smaller canals, called *distributary canals*. From these, water would flow through *watercourses* and finally into *field channels* on farms. The government of Rajasthan would build all the canals except field channels, which farmers would build.

The project got under way in the early 1950s. As the canals were built, the land was surveyed and divided into farms of six hectares (fifteen acres). The government of Rajasthan made loans to farmers to enable them to buy the new farms and settle on them.

Figure 1. The Canal System of the Rajasthan Canal Project



Ranjit and Sitadevi heard about the canal project, and they talked of it often. Some in their village said that people could get a fresh start on that new land by getting a loan to buy a farm and work it with irrigation. Others spread different stories. Rich landowners were buying up the land, they said, so it was not likely that people like them would even be able to buy any. Besides, some said, it was so far away—more than 160 kilometers (100 miles). Who would want to go so far from home?

The more they wondered about it, the more Ranjit and Sitadevi became convinced they should find out more. It might be their one chance to make a better life for themselves and their children. So one autumn, after the crops were in, Ranjit set off for the government office in Suratgarh. Looking back on it later, he would remember the knot of fear that remained in his stomach during the long journey. Would he be able to learn irriga-

tion methods? Would this new place offer his family a better life? Would there even be a farm for him? Questions nagged him, and the knot remained.

In the government office in Suratgarh, an official told Ranjit that he was eligible for a loan to buy a farm—he had lived in Rajasthan all his life, he owned no other land, and he knew how to farm. But first he must fill out an application.

Ranjit's heart sank. He could neither read nor write. What could he do with this strange-looking form? Then other applicants showed him how to find a clerk who would fill out the form for him.

Ranjit returned to the office and handed in the application. Everything was fine, the official said, but there was no land for him. He should come back in six months and try again.

The news was discouraging, but Ranjit felt hopeful.

A government office was no longer so strange and mysterious. He would have no trouble going through this again. Six months later, he was back in Suratgarh, and again he was told he must wait. Determined now, Ranjit made a third trip, then a fourth. And on that fourth trip, on a memorable day in 1965, he was informed that he would receive a loan for the purchase of a farm. The land was located 40 kilometers (25 miles) from Suratgarh, near a town called Bijeynagar.

"You will have to help other farmers build a watercourse from the nearest distributary canal," the official

said. "But do not worry. You will soon have plenty of water."

Back home again, Ranjit and Sitadevi set to work packing their belongings. Sitadevi said little, but he knew that she shared his mixed feelings. What would it be like to live so far away? Would it ever feel like home? He was thirty, and she was twenty-nine. Were they too old to take such a risk?

They made the long move and began their new life. Ranjit built a house in the village near his farm. It was just like the one they had left, but he added a small courtyard

for goats. They looked with pride on his work when it was finished. It was even better than the old house, because it was near their own land.

Months of hard work followed, but they gradually made progress. Ranjit helped his neighbors with the watercourse and asked countless questions to find out more about how to use irrigation for farming. A field-worker from the Department of Agriculture visited the village and helped him with some of the questions.

Mostly, though, he learned by watching and by trying things himself. The first crops of beans and millet were

better than he had ever grown before. Ranjit loaded up the surplus he could spare and carried it over the rough road to Bijeynagar to sell at the market there.

The next year, he tried an experiment. He planted some wheat and mustard, knowing he could sell them. The new crops did well, and he came back from town with a little more money.

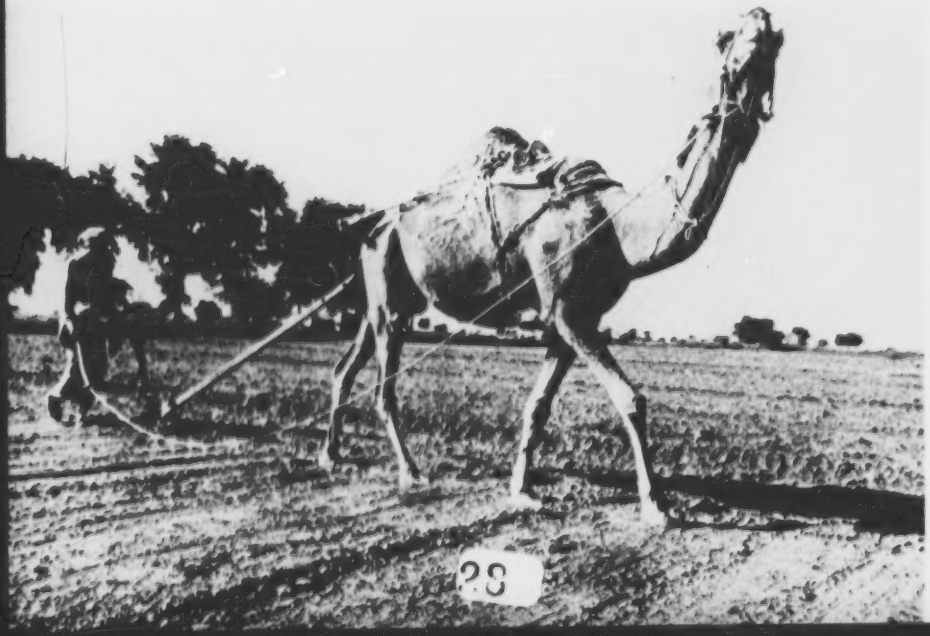
He began to dream of owning sheep. What a difference that would make! The animals would provide the family with meat, and Sitadevi could spin wool and weave it into cloth. But he knew it was an idle dream: he could not

grow fodder. In fact he had been taking a risk with the wheat and mustard, because his first need was to grow food crops. Half of his land was covered with sand dunes and scrub brush and was worthless as pasture. And there was no pasture land nearby.

Ranjit forced that dream to the back of his mind and looked for other ways to improve his family's lot. He took a loan from the village money-lender and used it to buy a camel. The animal made plowing and cultivating much faster and more efficient. If only he could get the camel to perform the miracle of leveling those dunes.

Working the farm was easier now that the children were growing up. His two oldest sons helped with the farm and sometimes worked as day laborers on other farms when there was work to be found. He felt badly that they could not continue school, but the fees were too much for the family to afford. Already he had to think of taking his third son from school.

Life was indeed better, but many things troubled Ranjit. For one thing, the household had grown. His father had died and his mother, nearly blind now, had come to live with them. His oldest son planned to marry and was building a room onto the house. Ranjit



welcomed these additions to the family, but he worried about the need to grow still more food.

Another concern was Sitadevi. For months she had not been well, troubled by a mysterious illness that sapped her strength. Their household depended on her energy and wisdom. The children, too, had been suffering from the same strange sickness.

The irrigation system was perhaps most troubling of all. The family's survival depended on the mud-colored water, but the system had never worked right. Now there were new problems. Water was seeping through the bricks lining the watercourses, and much of the precious water was lost before it could reach the fields. The branch and distributary canals were leaking, too, and there seemed to be no way to repair them. The drifting, blowing sands made matters worse. A layer of silt had formed in the bottoms of the canals, reducing their capacity.

Already one could see a difference among the farms. Those that were closer to the Rajasthan Main Canal looked much more prosperous. Ranjit passed those lush fields and pastures when he occasionally went to Suratgarh. He was not an envious man, but he could not help wondering what it would be like to farm with a regular water supply.

Chapter Three

The Second Rajasthan Canal Project

By the early 1970s the officials responsible for the Rajasthan Canal Project knew that it had not yet proved to be the boon they had expected. True, nearly 100,000 more Rajasthanis had settled in the area, and many unemployed persons had found jobs as day laborers on farms. Food production had increased so much that there often was a surplus of food that could be shipped to other parts of India. But the construction of the canal network had gone more slowly than the government had hoped. Only half the land that was to have been opened up by this time was settled. Although some farmers were doing well, many others were not much better off than they had been before the project began.

Also in the early 1970s, the government of India decided to increase irrigation throughout the country. More irrigation would serve two purposes. First, it would improve the living conditions of poor farmers. With a reliable water supply, they could grow more crops and earn more money. As farms became more productive, other farmers who lived in the countryside but had no land would find work as day laborers. Second, it would increase the nation's supply of agricultural products, particularly the food needed by India's rapidly growing population. There was enough food in India when the monsoon brought enough rain, but not when the monsoon failed, as it did in the early 1970s. There had been drought in much of India, and food had been imported.

In 1972 representatives of the government of India and the government of Rajasthan designed a project to im-

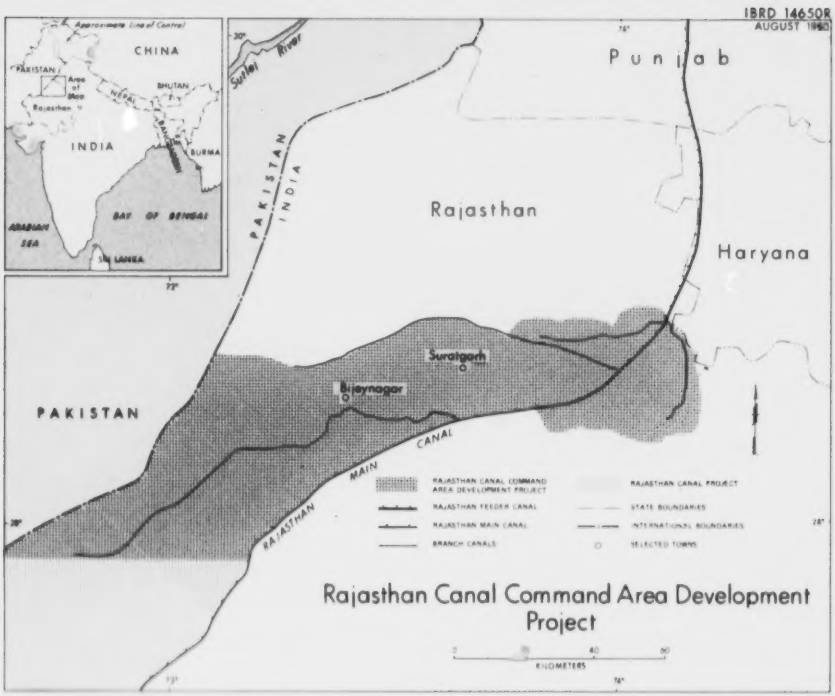
prove the Rajasthan Canal. The government of India approached the World Bank for a loan to cover part of the cost of the project. The World Bank had made more than a hundred loans to India and was familiar with the country's plans to increase irrigation.

Numerous discussions of a project for World Bank financing were held in 1972 and 1973 at meetings in Washington, New Delhi, and Jaipur, the capital of Rajasthan. Economists, engineers, and agricultural experts studied many questions. What was the soil like in Rajasthan? What crops would grow well there? What farming methods were best for Rajasthan? How much

water could the various canals supply? How much would farmers be able to grow on their land? How much money would they make? Would they make enough to repay the loans they received to buy land?

By 1974 Indian and World Bank officials had agreed on the details of a project. It was to be called Rajasthan Canal Command Area Development Project. Indian engineers use the term *command area* to refer to the area a specific canal system can irrigate. The project was to develop all the resources of the Rajasthan Canal command area—its land, its water, and its people.

The project was to affect the northern half of the



region served by the original Rajasthan Canal Project, an area about equal to that of the state of Rhode Island. The irrigated land in this area covered about 100,000 hectares (250,000 acres); it was estimated that the amount of irrigated land could be doubled. About 100,000 persons lived in the area in four small towns and seventy villages. With reliable irrigation, the population would double and many more towns and villages would spring up. It would take six years to complete the project.

The total cost of the project was to be $174,000,000, or 1,392,000,000 Indian rupees. The World Bank was to make a loan to cover 48 percent of the project cost; the governments of India and Rajasthan were to pay the remaining cost. The government of Rajasthan would recover some of its contribution by selling the farmland created by the project. About half the World Bank's con-

tribution would be used to purchase equipment and material needed for the project from other countries.

The government of India and the World Bank signed a loan agreement in July 1974. Loan funds were to be provided by the International Development Association, the part of the World Bank which makes interest-free loans, called "credits," to the world's poorest countries. India would begin to repay the credit in 1984, and the repayment period would be stretched over fifty years.

The Rajasthan Canal Command Area Development Project included many different activities, called "project components." The components of the project and their cost are shown in Table 1.

Table 1. Project Components and Cost

Project component	Millions of Indian rupees	Millions of U.S. dollars	Percentage of project cost
Canal lining	276.0	34.5	20
Roads	60.8	7.6	4
Afforestation	44.8	5.6	3
Village water supply	16.0	2.0	1
Land improvement	292.8	36.6	21
Fertilizer	157.6	19.7	12
Project operation	69.6	8.7	5
Estimated price increases and contingencies	474.4	59.3	34
All components	Rs. 1,392.0	$174.0	100

The first step was to improve the canal system. The Rajasthan Feeder Canal and the Rajasthan Main Canal were in good condition, but other large canals were not. The four branch canals and the distributary canals, 912 kilometers (565 miles) altogether, were to be lined with a double layer of tiles.

The main streets in many villages were to be paved. Roads linking villages and market towns were to be paved, too. Dirt roads connecting market towns to two-lane highways leading to other parts of Rajasthan,

Punjab, and Haryana were to be improved. In all, 420 kilometers (260 miles) of roads would be affected.

Trees were to be planted beside the roads and canals to shield them from windblown sand. In addition, trees and bushes were to be planted in belts 100 feet wide, called "shelter belts," on hundreds of hectares of high sand dunes. Shelter belts would further reduce wind damage, but they would serve as pasture, too. Controlled grazing would be permitted in the shelter belts. When grazing threatened the vitality of trees and bushes, an area would be fenced to prevent further grazing until the plants had recovered.

New systems to supply pure drinking water were to be set up in 100 villages, some that existed when the project began, and some that would develop as the project went forward. Wells would be dug. Pumps, filters, storage tanks, and chlorination facilities would be installed.

Thousands of acres of farmland in the project area were to be improved. Two steps were to be taken. The first would be to level low dunes. Farmers who owned land with low dunes would receive loans to enable them to level their land and buy fertilizer for the newly leveled land. By spreading out the sand, applying fertilizer, and

drenching it with water, 80,000 hectares (200,000 acres) of new farmland would be created.

The second step would be to line 5,800 kilometers (3,600 miles) of watercourses serving thousands of acres of farmland. Farmers would line the watercourses that served their land, using tiles supplied by the project. Only a single layer of tile was required for watercourse lining.

Three bureaus in the Rajasthan Ministry of Agriculture were to operate the project. Some of their expenses were included in the cost of the project. One bureau had been in operation for a long time; it was to be reorganized. For years, this bureau had trained field-workers who went into villages and worked with farmers. The training and responsibilities of field-workers were to be changed. The field-workers were to be called village extension workers. They would spend a great deal of time in villages, encouraging farmers to adopt new methods that would increase their crop yields and incomes. The new system was to be called the "training-and-visit system." More research about local farming problems was to be undertaken, too. The reorganized bureau was called the Agricultural Extension and Research Service.

Two new bureaus were to be created in the Ministry of Agriculture. One, called the Command Area Authority, would be responsible for the principal construction activities—canal lining, road building, and afforestation. This bureau would manage these resources when construction and planting were completed. The other new bureau, called the Rajasthan Canal Land Development Authority, would work closely with local commercial banks. Local banks would make loans to farmers to pay the cost of leveling their land and pay them for lining the watercourses that served them.

The project began at a time when the rate of inflation was high. Further price increases were anticipated and included in the cost of the project, together with an amount to cover unexpected expenditures that would surely arise.

Chapter Four

The Effect of the Project

Beginning in early 1974 Ranjit and Sitadevi guessed that something important was going to happen nearby. Government officials often came and went, and there were rumors about what might take place.

Gradually, word got around that the branch and distributary canals were to be lined. There were going to be new roads and wells. Trees would be planted on high dunes and along the roads. Farmers would be able to get loans to level their land. They would be given tiles to line their watercourses. Ranjit was delighted that his land was to be affected by these things, but he wondered whether so much would really happen.

Whenever Ranjit went to Bijeynagar, he heard about what was going on. One day in late 1974, construction started on a small building there. People said that it was a field office of the Command Area Authority, a new bureau of the Ministry of Agriculture. The people who worked in the field office would be in charge of lining the canals, building roads, and leveling the dunes. Soon engineers and surveyors were traveling in jeeps and trucks from the field office to the branch canal that served the area.

At the new office of the Rajasthan Canal Land Development Authority in Suratgarh, farmers were applying for plots of new farmland. Ranjit remembered his many trips to Suratgarh nearly ten years before. There were rumors that land was being sold to people who already owned land: this had sometimes happened in the days of the first project. There were rumors, too, that application procedures were being tightened to ensure that the rules about selling the new farmland were followed.

Workshops to house tools and other equipment were

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set up near the canals. Local people who owned camels and donkeys were given contracts to help with the construction. After a while, bulldozers, rollers, sandplows, graders, and cement mixers appeared. Many of the machines had been made in other countries, people said.

Everyone in the village talked about the project. Many went to see the branch canal after water had been diverted from it, exposing the bottom and sides. Near the canal, small factories were set up to form and bake

the tiles used for lining. One of Ranjit's sons got a job in a tile factory.

People who lived nearby got jobs using their camels, donkeys, and bullocks to transport tiles from the factories to the canal. Other local people were hired to lay the two layers of tile. Laying tile was demanding work, requiring care and precision.

As work on one section of the branch canal was finished, the equipment and tile factories were moved to a

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new location farther along. And as sections of the branch canal were completed, work began on the distributary canals. Another of Ranjit's sons got a temporary job laying tile on the distributary canal near the farm.

Ranjit and Sitadevi watched the activity near their village when the road to Bijeynagar was paved. Soon afterward, a new well was dug, and a new pump was installed in the village. People said their drinking water would be clean now. Sitadevi hoped this was true, for she knew that clean water would make everyone in her family healthier.

During the first year of the project, the branch canal and the distributary canal near Ranjit's farm were relined. Then Ranjit and his neighbors lined the watercourse that led water to their field channels. They earned a few rupees a day for the work, and members of their families were hired to help. Even Sitadevi worked with Ranjit for a little while. Enough tile for one layer was supplied by the project. When the watercourse was lined, water flowed into the field channels of Ranjit's farm. It was a glorious sight.

At last Ranjit could level the dunes on the part of his

land that he had not been able to farm. He received a loan to pay for the work from the bank in Suratgarh, and he hired a local earth-moving company to do the leveling. With the same loan, Ranjit was able to buy fertilizer for his newly leveled land. An agricultural expert connected with the project gave him instructions about how much fertilizer to use.

From his fields, Ranjit could see the changes that had been made in the high dunes at the horizon. Trees and

bushes had been planted to create a shelter belt there, and he knew that less sand would blow onto his fields and into the the watercourse. A year after the shelter belt was planted, Ranjit heard that grazing was permitted there. So he bought the sheep that he had wanted to buy for many years, and one of his sons took the sheep to graze every day.

After a couple of months, however, so many farmers were grazing their sheep in the shelter belt that project officials fenced it so the plants could recover from over-grazing. Ranjit was discouraged: he had to grow fodder

after all. But a year later, some project officials met with Ranjit and his neighbors to discuss the problems of grazing. They agreed on an area in the shelter belt and on a schedule for grazing. Farmers from other villages would have a different grazing area in the shelter belt.

About two years after the project began, Ranjit was invited to participate in the new training-and-visit system sponsored by the Agricultural Extension and Research Service. When he first heard about it, Ranjit was

skeptical: he was afraid it would not be any better than the old system for training farmers. But when the new system was explained to him, he felt it was a great improvement, and he participated in it enthusiastically.

Under the training-and-visit system, Ranjit and ten other farmers met with a village extension worker for a training session every two weeks. They discussed the most pressing problems the farmers faced at the time, and the extension worker made some suggestions about how best to deal with the problem.

After each meeting, Ranjit and the other farmers

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talked to more farmers about the problem they had discussed with the extension worker. These farmers, in turn, passed along the extension worker's suggestions to still other farmers. When the extension worker returned to Ranjit's group two weeks later, they dealt with another pressing problem and the chain of communication among farmers was repeated.

Ranjit gradually began to trust the extension worker. At first, the extension worker suggested things the farmers could do without spending any money—weeding, spacing their plants, or better preparing their land for planting. Ranjit tried the new methods on only a small part of his land. When he found that he produced more, he used the new methods on the rest of his land.

Gradually Ranjit produced more crops and began to make more money. He and the other farmers asked for additional help from the village extension worker. They were now willing spend some money, and the extension worker helped them choose the best seeds and fertilizers. Their production increased even more. The extension worker told the farmers that agricultural specialists were studying their problems in a laboratory nearby. Ranjit thought the system was good: it had certainly helped him.

In 1978, four years after the project began, Ranjit's farm was producing so much that he found it difficult to harvest his wheat, mustard, and cotton, even though his sons worked with him. Many of his neighbors had the same problem. During one harvest period, some of them were unable to harvest their fields, and they suffered severe losses. Ranjit worried that this might happen to him. He sent word to one of his brothers who still lived on their father's land near Bikaner. His brother came with his family to join Ranjit.

Eventually the news spread that there were jobs as day laborers on farms in the Rajasthan Canal area. Unemployed farmers began to migrate there from Punjab and Haryana and settle down. By the end of 1979, the acute shortage of farm labor ended.

Ranjit's house was crowded after his brother came, even though the two brothers built a simple shelter for the second family. Ranjit decided that the time had come to leave his village house and build a new one on his farm. It was a symbol of success, for only farmers who are well off can afford to build houses on their farms. Ranjit was pleased because he could afford to build the new house with cinderblocks.

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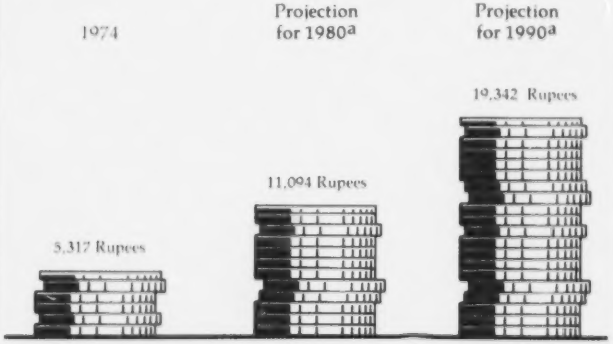
Most of the funds earmarked for the Rajasthan Canal Command Area Development Project have been spent. The changes in the project area have been considerable. The number of people living in the area has doubled: many are new landowners; many others are regularly employed as day laborers. Two hundred thousand hectares (500,000 acres) of farmland are irrigated all year round. On 18,000 farms that formerly produced very little, agricultural production has sharply increased. Families that formerly owned no farmland are settled on 15,000 new farms, which are in production for the first time.

The government of Rajasthan has recovered some of the construction costs of the project by selling the newly created farmland and charging landowners an annual fee for the use of water. Some of this money covers the cost of operating and maintaining the canals and roads.

The income of the average farm family has more than doubled. This increase is shown in Figure 2. The production of crops in the Rajasthan Canal area has also increased substantially. Production figures for individual crops are shown in Table 2.

Figure 2. Farm Family Income in the Rajasthan Canal Command Area, 1974, and Projections for 1980 and 1990



a. These amounts were projected at the time the project was planned; the projections for 1980 have been exceeded.

Because of the increase in agricultural production, farmers in the project area are able to feed their own families adequately and produce a surplus to sell. They have enough fodder for their animals. Wheat, vegetables, and mustard, which is processed into cooking oil, are regularly shipped to other parts of India. Food crops grown in the project area have helped India in its drive to stop importing food. Cotton grown in the project area goes to textile mills, where cloth is woven for use in India and for export.

Table 2. Agricultural Production in the Rajasthan Canal Command Area, by Crop, for 1974 and Projections for 1980 and 1990

Crop	Production in 1974 (tons)	Production projected for 1980[a] (tons)	Production projected for 1990[a] (tons)
Fodder	125,000	506,000	585,000
Wheat	38,000	207,000	276,000
Sugarcane	45,000	135,000	160,000
Pulses[b]	32,200	131,500	153,600
Cotton	22,800	82,800	115,000
Mustard	6,300	26,800	38,400
Other[c]	11,500	73,300	105,000

a. These statistics were projected at the time the project was planned; the projections for 1980 have been exceeded.

b. Pulses are vegetables like lentils and are a basic food crop in India.

c. Millet, peanuts, rice, potatoes.

In addition to farmers, many other people in the project area are better off because of the economic activities the project has stimulated. Thousands were temporarily employed in the construction related to the project —in manufacturing tiles, lining canals, planting trees, improving farmland, and constructing roads. Permanent new jobs were created in market towns, where warehouses, platforms, and display areas were enlarged to accommodate the increases in agricultural production.

Plants were constructed for ginning cotton and processing food, and these provide additional jobs. Because roads are better and incomes are higher, more people visit health clinics in the towns in the project area. New schools have been built, and school enrollment has increased.

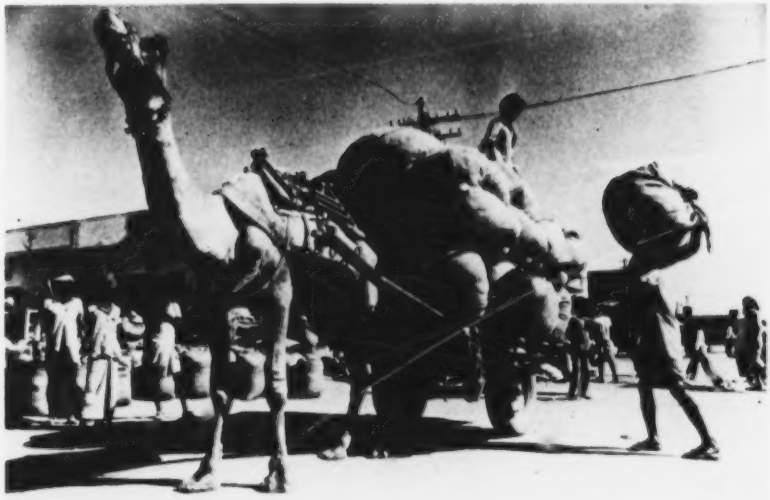
Officials who supervise the Rajasthan Canal project — on behalf of the government of India, the government of Rajasthan, and the World Bank — notice that people in the project area now have more positive attitudes. Those

people are more energetic because they are eating more and their health is improving. They are more enthusiastic about their work, and they now express hope for the future.

The Rajasthan Canal Command Area Development Project is one of a series of projects to extend and improve irrigation in India. The government of India and the governments of ten Indian states have undertaken similar projects, all supported by loans from the World Bank. Among them, the Rajasthan Canal Project is unique because it transformed desert into farmland. But all the projects are alike in developing the resources of the areas they serve—their land, their water, and their people.

About $1.5 billion is to be spent for all these irrigation projects. Because of them, about 6 million landowners and farm laborers will receive more income. More than a million other persons will earn more income from jobs in construction and transportation related to the projects and in market towns where agricultural products are sold. Many other Indians will benefit from the increased supply of food and other agricultural products.

The achievement of these projects, although impressive, must be measured against India's massive development needs. Seven million people benefiting directly from irrigation projects is a small number in relation to India's total population of more than 690 million. India needs even more irrigation. It needs many other things as well—more factories, more energy, more schools, more hospitals, more trained people, more agricultural production, more transportation and communication. These needs are a challenge to the Indian people and their national and state governments. These needs are also a challenge to the industrialized countries, which can help India by providing money, expert advice, and an economic environment in which India's growth can continue.



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Ranjit had been at it all day, directing water to the rows of wheat and mustard, working the life-giving liquid into the soil. Occasionally he would rise to stretch and look with pleasure at the crops—row on row of green above the dark, wet soil.

When it was time to stop for the day, Ranjit shouldered his hoe and headed toward his house. He looked across his fields to the high dunes in the distance where shrubs and trees had been planted. There were still many sandstorms, but the trees stopped the wind from blowing so much sand onto his fields. As his eyes followed the line where his green, irrigated land met the brown of the dunes, he smiled with satisfaction. He remembered so well the days when there was only desert stretching far away to the horizon.

As he approached his house from his fields, Ranjit saw his two youngest children playing together. They still wore their school clothes, he noted. Now fourteen and fifteen, they were attending secondary school—the first in his family ever to do so. They looked so much healthier and more energetic than his older children had been at this age.

Sitadevi smiled as Ranjit came closer. The medicine

she had received the previous year from the clinic in Bijeynagar had made her feel better. She returned once a month for a check-up, and the pains were almost entirely gone. Ranjit's mother sat near the entrance to the house, listening to the small transistor radio his brother had recently given her.

The fragrant odors of curry reached him. The meal that night was to be special: Ranjit's son-in-law had arrived to take his wife home again after the birth of their second child. They would leave the next day, so on this night all the family would gather.

Ranjit saw his eldest son heading toward the house with his wife and two children. His second son would arrive soon, but alone. His wife had died when her first baby was born several years before. Too bad, Ranjit thought, that the clinic had not yet opened. If it had, she might have been saved. But his son would marry again soon; then there would be more grandchildren.

Ranjit's life is full these days, so full that he rarely thinks about the days when he worked his father's land with so little hope. As Ranjit lowered his hoe from his shoulder, the memory of his father was vivid for a moment. Ranjit could hear his father's voice: We must work hard, he used to say, and pray for the blessing of Lakshmi, the goddess of prosperity. I have worked hard, Ranjit said to himself, and I am grateful to Lakshmi for her many blessings.

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NATIONAL CAPITAL
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AFGHANISTAN
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Teaching Guide

The Rajasthan Canal Project

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TOWARD A BETTER WORLD

World Bank Educational Materials

TEACHING GUIDE

to accompany

THE RAJASTHAN CANAL PROJECT

- A Case Study of Economic Development -

ECONOMIC SUMMARY: INDIA

WHAT HAPPENS WHEN A DESERT BLOOMS

- A Sound Filmstrip -

TOWARD A BETTER WORLD is a multi-media kit of educational materials published by the World Bank. It was developed in cooperation with school systems in Washington, D.C. and its suburbs and was classroom tested in 1979 and 1980. The contents of the kit are listed on page 4 below.

The World Bank is an international organization owned by nearly 140 countries. Its work is to help poor countries in their efforts to improve the living conditions of their people. It does this by lending money to its poorer member countries for development projects. The International Development Association, which is part of the World Bank, makes long-term loans at low cost to the world's poorest countries. The World Bank began to operate in 1946; the International Development Association was founded in 1960. Their loans to developing countries now amount to about $12 billion a year.

This teaching guide was written by Harriet Baldwin with the assistance of individuals listed on page 6. It was edited by Bruce Ross-Larson. Statistics, maps, and figures were supplied by various departments of the World Bank. The denominations used and the boundaries shown on the maps do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or an endorsement or acceptance of such boundaries.

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FOREWORD

TOWARD A BETTER WORLD is a multi-media kit of educational materials for secondary students developed by the World Bank. It deals with world poverty and the economic and social changes that must be made to relieve it. The kit includes the following items:

Materials about economic development

Student book: THE DEVELOPING WORLD
Sound filmstrip: SOME BIG QUESTIONS
Sound filmstrip: TOWARD A BETTER WORLD
TEACHING GUIDE

Case studies of economic development

1. Student pamphlet: ECONOMIC SUMMARY: INDIA
   Student book: THE RAJASTHAN CANAL PROJECT
   Sound filmstrip: WHAT HAPPENS WHEN A DESERT BLOOMS
   TEACHING GUIDE

2. Student pamphlet: ECONOMIC SUMMARY: KENYA
   Student book: SMALL-SCALE INDUSTRIES IN KENYA
   Sound filmstrip: SMALL-SCALE INDUSTRIES IN KENYA
   TEACHING GUIDE

3. Student pamphlet: ECONOMIC SUMMARY: MEXICO
   Student book: TACKLING POVERTY IN RURAL MEXICO
   Sound filmstrip: MANY STEPS, ONE GOAL
   TEACHING GUIDE

Rationale and point of view

Relieving world poverty is one of the pressing problems of our time. Three-quarters of the world's people live in countries that are poor. Nearly a billion people in poor countries are hungry, illiterate, in poor health, and without productive employment. Other hundreds of millions are only a little better off. Because the populations of the poor countries are increasing, each year millions more people must be fed, educated, and provided with houses, clothing, jobs, health services, and pure drinking water.

In the past thirty-five years, the poor countries have engaged in economic development to improve the living conditions of their people. They have done so mainly by using their own resources, although the rich countries have provided technical and financial assistance. As a result of these efforts, all poor countries have made some progress; a few have made dramatic gains. But widespread poverty remains and threatens to increase. It affects rich countries as well as poor in an increasingly interdependent world.

For more than thirty years, the World Bank, in cooperation with governments and other institutions, has been assisting the world's poor countries in the process of economic development.

TOWARD A BETTER WORLD draws on that experience. The purpose of the World Bank in publishing TOWARD A BETTER WORLD is to help young people better understand the need for and the process of economic development. Economic development is helping hundreds of millions of people to improve their physical and material well-being and better fulfill their potential as human beings. Hundreds of millions of others must be affected by it if humanity is to move toward a better world.

Goals

TOWARD A BETTER WORLD has two educational goals. The first goal is to increase students' knowledge -- of the nature and extent of world poverty, of the process of economic development, and of the growing interdependence of rich and poor countries that economic development is bringing about. The second goal is to encourage students to develop informed opinions -- about relieving world poverty, about economic development, and about global interdependence.

Approach

The approach of TOWARD A BETTER WORLD is to introduce students to the nature of life in the developing countries, to the process of economic development, and to the effects of economic development in the developing countries and in the world as a whole. Against this background, case studies of specific development projects are presented to illustrate economic development vividly and in detail. The case studies are of projects that have been partly financed by the World Bank and its affiliate, the International Development Association. Information is presented in statistical and descriptive form in books, pamphlets, and sound filmstrips. Lesson plans provide opportunities for students to enter imaginatively into the experiences of people in the world's poor countries, and to use the knowledge they acquire in their study to clarify their opinions.

Contributions to the social studies curriculum

TOWARD A BETTER WORLD makes three contributions to the secondary school social studies curriculum. First, it deals with two major concepts examined in social studies: change and interdependence. Second, it presents a number of economic concepts and terms that all citizens should understand. Third, it offers opportunities for strengthening skills in reading, writing, geography, and critical thinking, and in using statistical tables, graphs, and charts. The kit is designed as supplementary material, to be used in such courses as world geography, world history, world studies, global studies, and current issues. The entire kit can be used as a unit of six to nine weeks in these courses, or items in it can be selected for use in existing units.

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Mr. Ray Frapolli, Poolesville High School
Mr. Robert Gecan, T.S. Wootton High School
Mrs. Jean Kandel, T.S. Wootton High School
Miss Nancy McCullough, Walter Johnson High School
Miss Margaret Shultz, Gaithersburg High School

Prince George's County Public Schools, Maryland
Dr. Dana G. Kurfman, Supervisor of Social Studies
Mr. Ronald Anderson, Parkdale Senior High School
Mr. Fred Crouch, Duval Senior High School
Mrs. Barbara Graves, Gwynn Park Senior High School
Mr. Bill Miller, Northwestern High School
Miss Teresa Wolf, Eleanor Roosevelt Senior High School

Alexandria Public Schools, Virginia
Mr. Jack Henes, Coordinator of Social Studies
Mrs. Faye Das, George Washington High School

Fairfax County Public Schools, Virginia
Mr. Frank Taylor, Social Studies Curriculum Specialist
Mr. William Bartlett, McLean High School
Miss Melanie Biermann, McLean High School
Mr. Ron Maney, McLean High School

Prince William County Public Schools, Virginia
Mrs. Barbara Davis, Supervisor of Social Studies
Miss Jill Gentry, Stonewell Jackson Senior High School
Mr. Ed Johnson, Gar-Field Senior High School
Mrs. Emma Matheny, Osbourn Park Senior High School
Mrs. Nancy Shepard, Brentsville District Senior High School
Mrs. Brenda Shifflet, Woodbridge Senior High School

INTRODUCTION TO THE RAJASTHAN CANAL PROJECT

This Teaching Guide accompanies a pamphlet, book, and sound filmstrip which, together, present a case study of the Rajasthan Canal project in northwestern India. This case study is one of several included in the multimedia kit, TOWARD A BETTER WORLD. The case studies should follow an introduction to economic development in which students read the book, The Developing World, and view two filmstrips. The introductory study is outlined in the Teaching Guide: The Developing World, and materials for it are in the multimedia kit. When this study is finished, the case studies may be undertaken in any order.

The case studies may be used apart from The Developing World. When they are used in this way, teachers should be prepared to make some adjustments in the activities suggested in the Teaching Guides that accompany the case studies.

Materials

The materials to be used with this Teaching Guide for the case study of the Rajasthan Canal project are as follows:

Student pamphlet: Economic Summary: India

Student book: The Rajasthan Canal Project

Sound Filmstrip: What Happens When a Desert Blooms

Worksheets (included in the Teaching Guide, beginning on page 51; those preceded by an asterisk are for highly motivated students):

	No. 1.	What Do You Know About the Indian Economy
	No. 2.	India and Neighboring Countries
*	No. 3.	A Meeting of the India Consortium
	No. 4.	While You Read
	No. 5.	How Good Are You at Locations?
	No. 6.	The Canal System of the Rajasthan Canal Project
	No. 7.	Project Components and Costs
*	No. 8.	Meeting with the Ministry of Finance of the Government of India
*	No. 9.	How Much Will Farm Income Rise?
	No. 10.	Graphing Changes in Agricultural Production
	No. 11.	Test
*	No. 12.	Additional Activities

The following materials will enrich the study. They are not included in the multi-media kit, TOWARD A BETTER WORLD, but are easily available.

Nectar In a Sieve, by Kamala Markandaya (New York: New American Library, a Signet Book, 1954. 190 pages. $1.25). This novel portrays the life of a rural Indian woman--her girlhood and marriage, her family's experience in farming a small plot of land for a landlord, the loss of that land, and finally the illness and death of her husband.

"The Pageant of Rajasthan" (National Geographic, Vol. 151, No. 2, February 1977) will add to students' awareness of the setting of the Rajasthan Canal project.

A Day in Shrishnagar, a film produced by the World Bank (15 minutes, color, 1979), documents a farmer-training program similar to the one described in The Rajasthan Canal Project. The film may be rented for $20 from the Audio Visual Division, The World Bank, 1818 H St., N.W., Washington, D.C. 20433.

Overview

The Rajasthan Canal project is in the desert area of northwestern India where irrigation has been practiced since ancient times. The project began in the 1950s with the building of a canal system in an area not previously irrigated. In 1974, a second project got underway, called the Rajasthan Canal Command Area Development Project (called "the second Rajasthan Canal project" in these materials). The goals of the second project are to improve the living conditions of poor and landless farmers in the area, and to increase agricultural production for local and national consumption.

To achieve these goals, the old canal system is being upgraded, transforming desert land into farmland and improving hundreds of thousands of acres of existing farmland. Farmers are learning modern farming methods, village water facilities are being upgraded, and roads are being improved making markets, schools, and health care more accessible. The project is benefitting half a million people in the area served by the canal system and many others elsewhere in India.

Students will begin the case study by comparing living conditions in India and the United States, using the Economic Summary: India. They will consider India's resources, its massive population, and its program of economic development. Thus they will see the Rajasthan Canal project as one of India's many development efforts.

Against this background, students will read the book, The Rajasthan Canal Project. They will learn about a family living

on unirrigated land in Rajasthan in the 1950s, and follow the family to a new farm on land irrigated by the new canal system. Students will share the family's disappointment when the canals fail to supply enough water. Recognizing the need for improvement, students will examine the second Rajasthan Canal project--its objectives, its components and cost, and its sources of funding. They will see life change for the family they are following, and will note how the project is changing life for many families in the project area and for many others in India. To review the project, students will see the filmstrip, What Happens When a Desert Blooms.

Objectives and Evaluation

The case study of the Rajasthan Canal project can be used to meet many educational objectives. The Lesson Plans that follow are designed to help students achieve the general objectives listed below. The achievement of these objectives may be measured in a test given in Lesson 8 (Worksheet No. 11).

Objective 1. Students will identify some characteristics of the Indian economy, and list some activities in which India is engaging to advance economic development.

Objective 2. Students will describe living conditions on unirrigated land in Rajasthan.

Objective 3. Students will illustrate the complexity of the Rajasthan Canal Command Area Development Project (the second Rajasthan Canal project) by stating its objectives, identifying its costs and sources of funding, and listing several of its components.

Objective 4. Students will describe living conditions on irrigated land in Rajasthan today.

Objective 5. Students will explain how the Rajasthan Canal project contributes to economic development in India.

Objective 6. Students will locate the following places on a map of the Indian subcontinent:

Arabian Sea	Rajasthan	India
Bay of Bengal	Afghanistan	Nepal
Indus River and its tributaries	Bangladesh	Pakistan
Thar Desert (The Great Indian Desert)	Bhutan	Sri Lanka
	Burma	
	China	

LESSON PLANS

Introductory Notes for Teachers

- Lesson Plans are organized in 8 lessons, one of which is a test. Most student groups should be able to complete one lesson in a single class period.

- The Lesson Plans are designed to follow the study of the book, The Developing World, from the multi-media kit, TOWARD A BETTER WORLD. Teachers will need to change a few activities in the Lesson Plans for students who have not read that book.

- Lesson objectives are derived from the general objectives of the study listed on page 9. Activities in which students may demonstrate the achievement of the lesson objectives are listed following each objective.

- Activities are numbered according to the lesson in which they occur and the sequence within the lesson.

    - Activity numbers followed by letters (i.e., 2.2.a. and 2.2.b.) indicate that the activities are alternatives. Teachers should choose only one of them.

    - Activity numbers preceded by asterisks indicate activities for highly motivated students.

    - Supplementary activities are included at the end of most lessons.

- Vocabulary that may be new to students is listed at the beginning of each lesson. Teachers should be sure that students understand the vocabulary before beginning the lesson, but activities to strengthen mastery of vocabulary are not included in the lesson plans.

- Discussions in which students imagine the feelings of Indian individuals should be open-ended. Teachers should encourage students to express their ideas freely, but to support them with information acquired during the study.

- Worksheets are found at the end of the Teaching Guide. By cutting them along the line of dashes, they can be removed for duplicating without damaging the book. Most worksheets

are presented as individual activities, but many can be adapted for small group work. Teachers should read each worksheet carefully before using it to determine whether it is appropriate for their class.

- The test in Lesson 8 (Worksheet No. 11) measures students' achievement of the general objectives of the study listed on page 9.

- Additional activities that will enrich the study:

  - a bulletin board display of pictures and magazine and newspaper articles about India.

  - talks by students or adults who have lived or travelled in India.

  - listening to recordings of Indian music.

***

For homework on the day before the case study is to begin, have students complete Worksheet No. 1. Explain that they are starting a case study of a project in India, and that a good way to begin is to find out how much they already know about India. Tell them to answer the questions quickly, as well as they can, guessing and using their common sense.

Lesson 1 THE ECONOMY OF INDIA (1)

Lesson Objectives

As a result of this lesson, students should be able to:

1. Locate the following places on a map of the world and a map of the Indian subcontinent:

Arabian Sea	Bhutan	Nepal
Bay of Bengal	Burma	Pakistan
Afghanistan	China	Sri Lanka
Bangladesh	India	

(Activity 1.2)

2. Compare the living conditions of typical teenagers in India and in the United States, making inferences from statistics. (Activity 1.4)

3. List some of India's resources and products and discuss the question, "Why is India such a poor country?" (Activity 1.5)

Materials

Worksheet No. 1. How Much Do You Know about India? (cont'd.)
Economic Summary: India
Worksheet No. 2. India and Neighboring Countries (for homework)

Vocabulary

consume
dialect
drought
economic
gross national product (GNP)
GNP per capita
hydroelectric
indicator
monsoon
tenant farmer

Lesson 1 THE ECONOMY OF INDIA (1)

Activities

Note: For homework on the day before the case study is to begin, have students complete Worksheet No. 1. Explain that they are starting a case study of a project in India, and that a good way to begin is to find out how much they already know about India. Tell them to answer the questions quickly, as well as they can, guessing and using their common sense.

1.1. Introduce the study. Explain to students that they are going to learn about a specific development project now underway in India. The case study will help them understand economic development in greater detail. Tell them to put aside Worksheet No. 1 which they completed for homework. They will refer to it later.

1.2. Distribute the Economic Summary: India. Have students look at the map on the back cover.

- Have students name and point to the countries that border India. Have them name and point to Afghanistan, the Arabian Sea, and the Bay of Bengal. Then have them point to the same places on a wall map of the world.

- Explain that the northern boundary of India and Pakistan is disputed. This dispute explains the dotted line on the map labelled "Approximate Line of Control." Explain that this disagreement is complex and of long standing.

- Have students point to the various river systems. Point out the area in northwest India where there are no rivers. Explain that the case study they are beginning is located in that area, which is a desert, called the Thar Desert (pronounced "tar") or the Great Indian Desert. Have them trace the courses of the Indus River and its tributaries.

1.3. Have students look at the statistical table on the cover of the Economic Summary: India. Some statistics in the table may appear to students to be out-of-date. Explain that those in the table were the most recent and reliable ones available at the time the table was prepared.

- Lead a discussion comparing the items in the table for India and the United States. Discuss what each suggests about living conditions in the two countries.

- Remind students of the meaning of the two terms, GNP and GNP per capita. (GNP is the value of all the goods and services a country produces in a year; GNP per capita is the part of a country's GNP each person in the country would have if the GNP were divided equally among them.)

- Tell students there are two statistics about India they must master approximately: the population of India in 1978 (approximately 650,000,000), and its GNP per capita in 1978 (approximately $200).

1.4. Lead a discussion of the question, "What do these statistics indicate about the lifestyle of a typical Indian teenager compared with that of a typical American teenager?" Organize the discussion around the following topics:

- place of residence
- occupations of parents
- educational opportunity
- educational opportunity of parents
- health and health care
- food supply
- energy consumption

Have students identify the statistics they use to make comparisons. Ask them what the statistics suggest about housing, clothing, and recreation of Indian teenagers.

1.5. Ask students to look at the photographs and the graph in the Economic Summary: India. Ask the following question, "If you had only these photographs and the graph as evidence, how would you summarize the economy of India?"

Read the introductory paragraphs on page 2 aloud with students and discuss them briefly. Ask the question, "In what ways is India a rich country?"

Have students read silently the section entitled "The Economy of India" on pages 2-4. Tell half the class to list India's resources as they read: tell the other half to list India's products.

When the reading is finished, have students compare their lists. Lead a discussion of the question, "With so many resources and so many products, why do you think India is such a poor country?" (Students should be able to respond that India's resources and products are not enough to meet the needs of its growing population.)

1.6. Homework

1. Read "Economic Development in India" in the Economic Summary: India.
2. Make corrections in Worksheet No. 1.
3. Complete Worksheet No. 2.

Supplementary activities

* 1.7. After discussing the statistics in the Economic Summary: India, ask students to name some things that are probably important to Indian teenagers that the statistics do not provide information about. Students might respond that the statistics do not indicate what Indian teenagers like to do, are afraid of, hope to accomplish, wish for, feel about their families, etc.

Ask students where they might get such information. They might respond from novels, films, newspapers, anthropological and sociological studies.

1.8. After Activity 1.4, lead a discussion of the question, "How do you think a typical Indian teenager might react to life in the United States?"

Lesson 2 THE ECONOMY OF INDIA (2)

Lesson Objectives

As a result of this lesson, students should be able to:

1. Give examples of development activities India is engaging in and explain how each activity helps to improve the living conditions of Indian people. (Activity 2.3.a or 2.3.b)

Material

Economic Summary: India
* Worksheet No. 3. A Meeting of the India Consortium

Vocabulary

agricultural production
capital
exports
economic development
family planning
fertilizer
imports
industrial production
loans and grants
manufactured products
massive
monsoon
squalid

Lesson 2 THE ECONOMY OF INDIA (2)

Activities

2.1. Review Worksheet No. 1 briefly if necessary. Collect Worksheet No. 2 to be checked. Tell students they must master the locations of the places on the worksheet. Have them locate these places on a wall map of the world.

2.2. Lead a brief discussion of the reading students did for homework. Use the following questions:

- What are the goals of India's sixth development plan?
- Recall the following terms from reading The Developing World: economic growth, economic equity. Do you think that India is concerned with economic growth or economic equity, or both?
- The following sentence is at the end of the Economic Summary: India: "Few countries in the world face as difficult a development task as India." What does this sentence mean?

Either 2.3.a. Have students recall the development activities they read about in The Developing World. List them on the chalkboard:

increasing physical infrastructure
increasing industrial production
increasing foreign trade
increasing agricultural production
educating and training people
assisting the poorest people
slowing population growth

Divide the class into 7 groups. Assign one of these development activities to each group. Each group is to list all the development activities on pages 4, 5, and 6 of the Economic Summary: India that fall into the activity group assigned.

Let the groups work together for about 10 minutes. Then have them report on their lists to the class. Have students explain how each activity they listed helps to improve living conditions in India.

Lesson 2 THE ECONOMY OF INDIA (2)

* Or 2.3.b. Distribute Worksheet No. 3 and have students do it as a role-play. Organize the class into teams. Read the worksheet aloud. Assign each team two institutions or countries to represent at a meeting of the India Consortium. Have teams meet together for 10 minutes to make notes. Then convene the meeting of the Consortium and discuss the questions at the bottom of page 1 of the worksheet.

This activity may be used as a writing activity. If it is used in this way, have students choose an institution or country they will represent and prepare a paper expressing their views.

There is no homework assignment after this lesson.

Supplementary activity

* 2.4. Have students do one of the following writing activities. Explain that their papers must reflect the knowledge they have acquired from the statistics in the Economic Summary: India.

1. You are a journalist on the staff of a magazine published for American teenagers. You have been sent to India to write an article about the daily life of a typical Indian teenager. Imagine a boy called Rama, or a girl called Sita, and write the article, describing his or her daily life.

2. You are an Indian teenager who has been in school long enough to be able to write a letter. Write a letter to an American teenager describing your daily life, pointing out ways in which you are typical and ways you are not typical of all Indians.

Lesson 3 THE SETTING

Lesson Objectives

As a result of this lesson, students should be able to:

1. Locate the following places on a map of the Indian subcontinent:
   the Indus River and its tributaries
   Rajasthan
   the Thar Desert (the Great Indian Desert)
   (Activity 3.1)

2. Describe the geographic features of the desert area of Rajasthan. (Activity 3.2.a or 3.2.b)

3. List the problems faced by farm families living on unirrigated land in Rajasthan, and imagine the feelings of those families about their living conditions.
   (Activity 3.4)

Materials

The Rajasthan Canal Project. Pages 1-9
Worksheet No. 4. While You Read
Worksheet No. 5. How Good Are You At Locations? (for homework)

Vocabulary

Gandara
Guptas
Indus valley civilization
irrigated, unirrigated
kilometer (1 km = .62 miles)
Mauryas
Rajputs
Punjab
Rajasthan
rupees (rue-peez)

Lesson 3 THE SETTING

Activities

3.1. Explain to students that they will begin the case study of a development project in this lesson. Introduce the book, The Rajasthan Canal Project. Ask students to guess from the photograph on the cover what the case study might be about.

Have students look at the map on the back cover of the book. Have them name and point to the countries that border India, and its principal cities (New Delhi, Bombay, Calcutta, and Madras).

Explain that in India, as in the United States, there is a central government as well as state governments. Have students locate the states of Rajasthan and Punjab.

Direct students' attention to the "Pronunciation Guide" on page 2. Have them read aloud all the names listed. On a wall map of the world, have them locate as many places listed in the "Pronunciation Guide" as they can. (Bijeynagar, Bikaner, and Suratgarh are too small to be shown on most wall maps of the world.)

Either 3.2.a. In classes that need encouragement in reading, read pages 1-6 in The Rajasthan Canal Project to them, or have them take turns reading it aloud. Ask the questions on Worksheet No. 4 during the reading.

or 3.2.b. In classes that read well independently, have students read pages 3-9 in The Rajasthan Canal Project silently. Distribute Worksheet No. 4 and have them use it during their reading. Lead a discussion of the questions on the worksheet when students have finished their reading.

3.3. On the map on page 5, have students name and trace the courses of the Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej Rivers. Have them indicate the general location of the Thar Desert (the area on the map where there are no rivers), Rajasthan, and Punjab.

On the map on the back cover of the book, have students indicate the general location of the Indus River and its tributaries and the Thar Desert.

Lesson 3 THE SETTING

Have students look at the pictures in the reading. Ask them to compose captions for the pictures that summarize the reading.

3.4. Lead a discussion of the following questions:

- What things do you think might have made Ranjit and Sitadevi happy?
  (Family life, devotion to the land, their growing family.)

- What things do you think might have made them unhappy?
  (Too little food, hard work with little gain, ill health, the deaths of children, low quality housing.)

- What do you think Ranjit and Sitadevi could do by themselves to improve their living conditions?

3.5. Homework. Explain that the next chapter in The Rajasthan Canal Project will describe an effort to improve the living conditions of people like Ranjit and Sitadevi.

1. Complete Worksheet No. 5.

2. Read The Rajasthan Canal Project, pages 10-17.

Supplementary activity

3.6. Do research about the ancient Indus Valley civilization. Using the information you gather, answer the following questions:

a. What was the role of irrigation in that civilization?

b. List two ways in which the life of a farmer in 2000 B.C. would be similar to and two ways it would be different from Ranjit's life as described on pages 7-9 of The Rajasthan Canal Project.

Lesson 4 CANALS FOR RAJASTHAN

Lesson objectives

As a result of this lesson, students should be able to:

1. Imagine the feelings of a family facing the opportunity to move onto land irrigated by the Rajasthan Canal. (Activity 4.3.a. or 4.3.b)

2. Describe the problems faced by farm families living in the 1950s and 1960s in the area served by the Rajasthan Canal project. (Activity 4.4)

Materials

The Rajasthan Canal Project. Pages 10-17
Worksheet No. 6. The Canal System of the Rajasthan Canal Project
Worksheet No. 7. Project Components and Costs (for homework)

Vocabulary

agricultural output
application
beneficial
convinced
day laborer
eligible
field-worker
fodder
hectare (1 hectare = 2.5 acres)
landowners
millet
money-lender
pasture
prosperous
sapped
silt
surveyed

Activities

4.1. Collect Worksheet No. 5 to be checked. Lead a discussion of the reading students did for homework.

- Ask the question, "What objectives did the governments of India and Rajasthan hope to achieve in the Rajasthan Canal Project?"

- Have students summarize the story of Ranjit and Sitadevi by pointing to places in the story shown on the map on page 10, and explaining the pictures on pages 12-17.

4.2. Distribute Worksheet No. 6 and have students complete it, referring to the canal system diagram on page 11 in their books. Do the following role-play using the worksheet.

Appoint one student to play the role of an official of the government of Rajasthan in the early days of the Rajasthan Canal Project. Other members of the class will play the roles of farmers. The official is to meet with a group of farmers and use the chart in the worksheet to explain the canal system and to persuade them to build the watercourses that will carry water to their land. The farmers are to ask questions expressing their uncertainties about the canal system and building the warercourses.

Either 4.3.a. Lead a class discussion of the question, "What changes in their way of life did Ranjit and Sitadevi face when Ranjit was allotted land in the Rajasthan Canal area?" Use the following questions if necessary:

- How would their relationships change?
- How would their values be challenged?
- What risks would they have to take?

Continue the discussion with these questions: "Which of these changes do you think would have been easy for Ranjit and Sitadevi? Which would have been difficult?"

Or * 4.3.b. Organize students in small groups to plan the following role-play. Explain that there are certain things that Indians value highly: loyalty to their families, devotion to the place of their birth, the belief that they must work hard in whatever lot in life falls to them.

Ask students to prepare role-plays to show how these values would affect Ranjit and Sitadevi when they were deciding whether or not to apply for an allotment of farmland created by the Rajasthan Canal Project. What were their reasons for applying? for not applying?

Select one group to present its role-play to the class.

4.4 Lead a discussion of the situation Ranjit and Sitadevi faced after they had lived in the canal area for several years. Use these questions:

- In what ways were they better off than they were when they lived near Bikaner?
  (Ranjit made money from the sale of his crops; they had a camel; they had more to eat.)
- What problems did they face?
  (Half their land was covered with sand dunes; they had to feed many people; they couldn't afford school fees; the children died and Sitadevi was ill; irrigation water was irregular.)
- On balance, do you think they would have been glad they moved into the canal area?
- What do you think they could do by themselves to improve their living conditions?

4.5. Homework

1. Read The Rajasthan Canal Project, pages 18-23
2. Complete Worksheet No. 7.

Supplementary activity

4.6. Have a group of students do the following role-play.

They are a group of farmers gathered on market day in Bijeynagar. They are to recall how hopeful they were at the time the Rajasthan Canal project began, to discuss the problems the project has failed to solve, and to express their opinions about it. (See Activity 6.5)

Lesson 5 THE SECOND RAJASTHAN CANAL PROJECT

Lesson objectives

As a result of this lesson, students should be able to:

1. State the objectives and the cost of the second Rajasthan Canal project, describe its components, and explain how it is being paid for.

Materials

The Rajasthan Canal Project. Pages 18-23
Worksheet No. 7. Project Components and Costs (cont'd.)
* Worksheet No. 8. Meeting with the Ministry of Finance of the Government of India
* Worksheet No. 9. How Much Will Farm Incomes Rise?

Vocabulary

boon
chlorination facilities
command area
expenditures
grazing
project components
village extension worker
vitality

Lesson 5 THE SECOND RAJASTHAN CANAL PROJECT

Activities

5.1. Lead a discussion of the reading students did for homework. Use these questions:

- What were the objectives of the second Rajasthan Canal Project?
  (Improving the living conditions of farmers and increasing India's food supply.)

- What specific things happened in the early 1970s to bring about the second Rajasthan canal project? Bring out the following points in the discussion and list them on the chalkboard:
  - The government of Rajasthan wanted to improve the Rajasthan Canal system.
  - The government of India wanted to increase irrigation, to increase agricultural production, and to improve the living conditions of poor farmers.
  - The World Bank was willing to provide additional assistance to India.
  - Representatives of the governments and the World Bank discussed and planned the project.
  - A loan agreement was signed.

5.2. Lead a discussion of Worksheet No. 7 which students did for homework. Check students' arithmetic in Question 1, 1, a. through d:

a = $174,000,000 c = $90,480,000
b = 84,500,000 d = Rs. 732,840

In discussing question 1.e., be sure that students understand that India will repay the loan and thus pay the total cost of the project in the long run.

Check students' labeling of the pie charts. Have them explain each component briefly as they check their labels.

Discuss questions 3 and 4.

Tell students they are expected to remember how much the project cost and how it is being paid for.

Either 5.3.a. Lead a discussion of the following question: "Do you think the second Rajasthan Canal project is simple or complex?"

- What makes the project simple?
  (It has few objectives, though they are difficult to achieve; it affects a relatively small area of India; it deals mainly with farmers.)

- What makes it complex?
  (It has many components; many people were involved in planning it; several bureaus will manage it; it is expensive; it has several sources of funding.)

Or * 5.3.b. Distribute Worksheet No. 8 and have students do it as a role-play.

Read the worksheet with the class. Organize students into groups and assign each group a project component to describe and defend at the meeting. Have one group play the role of Ministry of Finance officials. Let the groups meet for about 10 minutes to plan their statements, then convene the meeting.

This worksheet may be used as an individual writing activity. For this use, have students choose two components of the project and write the statements they will make at the meeting.

5.4. Homework. Read The Rajasthan Canal Project, pages 24-34, and do the following:

a. List 5 ways in which Ranjit and Sitadevi and their neighbors benefitted from the second Rajasthan Canal project.

b. List three problems that arose as the project went forward and describe how they were solved.

Ask for volunteers to do a role-play in class the next day about the training program in which Ranjit participated (see pages 31 and 32). One student is to be Ranjit, the other another farmer. Ranjit is to explain the program to the other farmer and try to persuade him to participate in it.

Supplementary activity

* 5.5. Distribute Worksheet No. 9. Explain to students that the worksheet is an exercise like one done by planners of the second Rajasthan Canal project. Have students complete the worksheet; then discuss the questions on page 2.

Lesson 6 THE EFFECT OF THE PROJECT (1)

Lesson objectives

As a result of this lesson, students should be able to:

1. List at least five ways in which Ranjit, Sitadevi, and others in the project area benefitted from the second Rajasthan Canal project. (Activity 6.1)

2. List three problems the project created for people in the project area, and explain how each was solved. (Activity 6.1)

3. Describe the operation of the farmer training program introduced by the project, and explain its importance. (Activity 6.2)

Materials

The Rajasthan Canal Project. Pages 24-33.
Worksheet No. 10. Graphing Changes in Agricultural Production (for homework)

Lesson 6 THE EFFECT OF THE PROJECT (1)

Activities

6.1. Lead a discussion of the reading students did for homework.

Ask students to recall the specific ways in which Ranjit, Sitadevi, and their neighbors benefitted from the second Rajasthan Canal project. Make a list on the chalkboard:

- People got jobs connected with improving the canals.
- The road to Bijeynagar was paved.
- The village water supply was improved.
- Watercourses were lined.
- Rajit got a loan to level his land and fertilize it.
- Ranjit learned better farming methods and grew more crops; his income increased.

Ask student what problems the project created and how they were solved. Make a list on the chalkboard:

- Farmers who owned land bought new land; application procedures were tightened.
- Shelter belts were overgrazed; a grazing schedule was developed.
- There was a shortage of farm labor; more farmers moved into the area.

6.2. Ask students to recall how Ranjit felt when he first heard about the Training-and-Visit System. Ask these questions:

- Why do you think he was skeptical?
- Why do you think he would want to participate in it?

Have students who volunteered to do a role-play present it to the class. Discuss the role-play when it is finished.

Remind students of the discussion of project components in the preceding lesson. Ask the following question: "Do you think it was a good idea to include the farmer-training program in the project? Why or why not?"

Lesson 6 THE EFFECT OF THE PROJECT (1)

6.3. This activity may be used as a continuation of Activity 4.3.b or as a new activity.

Remind students who did Activity 4.3.b., and explain to others, that there are certain things that Indians value highly: loyalty to their families, devotion to the place of their birth, the belief that they must work hard in whatever lot in life falls to them.

Ask students to consider Ranjit's and Sitadevi's experiences throughout their lives. Lead a discussion of the following questions:

- How might their experiences have strengthened their values?
- How might their values have been changed?
- What changes in their lives brought by the Rajasthan Canal projects might they welcome?
- What changes might they regret?

6.4. Homework. Explain to students that one way of finding out how the second Rajasthan Canal project affected people is to learn about the lives of particular individuals, such as Ranjit and Sitadevi. Another is to use statistics about the area as a whole. The last part of the book contains such statistics.

1. Read The Rajasthan Canal Project, pages 34-40.

2. Complete Worksheet No. 10.

3. Begin to review for a test.

Supplementary activities

* 6.5. Have students do the following written activity.

You are a journalist on the staff of an Indian newspaper. Your assignment is to write an article about the second Rajasthan Canal project. You want to find out how the project has been of benefit to people in the project area and what problems have arisen for them as a result of the project. You have decided to base your story on an interview with Ranjit. Write the article for your newspaper.

Lesson 6 THE EFFECT OF THE PROJECT (1)

6.6. Have students who did Activity 4.6. do the following role-play.

They are the same group of farmers who discussed the Rajasthan Canal project on market day in Bijeyanagar. Now they are in Bijeynagar again, four years after the second Rajasthan Canal project began.

They are to recall the problems they discussed earlier and consider whether these problems have been solved by the second project. They must consider the problem the second project has encountered, and express their opinions about these problems and about the project.

Lesson 7 THE EFFECT OF THE PROJECT (2)

Lesson objectives

As a result of this lesson, students should be able to:

1. Interpret statistics to explain how the second Rajasthan Canal project is improving living conditions in the project area. (Activity 7.1.a or 7.1.b)

2. Give specific examples of ways in which the Rajasthan Canal project and other irrigation projects are helping to advance India's economic development goals. (Activity 7.2)

Materials

The Rajasthan Canal Project. Pages 34-40
Worksheet No. 10. Graphing Changes in Agricultural Production (cont'd.)
Filmstrip. What Happens When A Desert Blooms

Lesson 7 THE EFFECT OF THE PROJECT (2)

Activities

Note: Teachers should preview the filmstrip to be shown in this lesson, What Happens When A Desert Blooms. The narration is on page 43. Be sure to manage activities during the period so that 15 minutes will be left at the end to view the filmstrip.

Either 7.1.a. Lead a discussion of the reading students did for homework. Have students refer to Figure 1, page 34. Use these questions:

- What information does the figure provide? (Incomes of farmers doubled between 1974 and 1980, and will quadruple by 1990.)

- What do these statistics demonstrate about living conditions in the Rajasthan Canal area? (People have more income so they can buy more of the things they need--food, clothes, schooling, seeds, fertilizer, medicine.)

Have students refer to Worksheet No. 10. Use these questions:

- What information does the graph provide? (Agricultural production has increased many times,)

- What does the graph indicate about living conditions in the Rajasthan Canal area? (People have more fodder for their animals, more food for themselves, and enough agricultural produce to sell. With more food, they are healthier; with more produce, they have more income.)

- What does the graph indicate about living conditions in other parts of India? (Some Indians have more food because food produced in Rajasthan can be shipped to other parts of India.)

Ask students to list some changes that are taking place because of the project that Figure 1 and Worksheet No. 10 do not show.
(There are jobs in market towns and in new plants; more people are visiting health clinics; more children are in school; people are hopeful.)

Lesson 7 THE EFFECT OF THE PROJECT (2)

Or 7.1.b. Organize the class into small groups. Have each group plan a presentation to the class to demonstrate that the second Rajasthan Canal project has improved living conditions in the project area.

Students are to illustrate their presentations with Figure 2 on page 34 and Worksheet No. 10, and to include other information on pages 34-36.

Have the groups plan their presentations for about 10 minutes. Then select one group to make its presentation to the class. Other groups should be prepared to add information omitted in the presentation.

7.2. Lead a discussion of the relationship of the Rajasthan Canal project to India's economic development program. Use these questions:

- What are the goals of India's sixth development plan? (See the Economic Summary: India, page 4.) (To increase industrial and agricultural production, especially of food; to assist the poorest Indians; to develop energy resources.)

- In what specific ways does the second Rajasthan Canal project help India achieve these goals? (In enables poor farmers in Rajasthan to earn more income; it provides jobs for farmers and others; it enables people to get to schools and health care more easily; it supplies more food.)

- What reasons can you give for finding the Rajasthan Canal projects encouraging? discouraging? (Many people are helped, but their number is small in relation to the total population of India.)

7.3. Explain to students that they will view a filmstrip about the Rajasthan Canal project to help them review for the test they will take the following day. Show What Happens When a Desert Blooms and discuss it briefly.

7.4 Homework. Prepare for a test. The test will cover the Economic Summary: India and The Rajasthan Canal Project, and will have four parts: a map question, multiple-choice and short-answer questions, and an essay question. In the essay question, students will explain how living conditions are changing as a result of the Rajasthan Canal project.

Lesson 7 THE EFFECT OF THE PROJECT (2)

Supplementary activity

7.5. Remind students of the statement in the book that people close to the second Rajasthan Canal project feel that the attitudes of people in the project area are more positive, and that people are more energetic and hopeful.

Have students work in teams, re-reading pages 39 and 40 and listing specific details of Ranjit's life which illustrate the statement above. Have students work for about 10 minutes. Then have them compare their lists.

Lesson 8 TEST

During this lesson, students will take a test. There are no additional objectives for the lesson.

Materials

Worksheet No. 11. Test
* Worksheet No. 12. Additional Activities

Activities

8.1. Distribute Worksheet No. 11 which is a test. Point out to students that there are four parts to the test. They should spend no more than 5 minutes on Part One, 15 minutes on Parts Two and Three, and 15 minutes on Part Four.

Time students as they take the test: after 5 minutes tell them to go on to Parts Two and Three; 15 minutes later, tell them to go on to Part Four.

Instructions for grading the test begin on page 39.

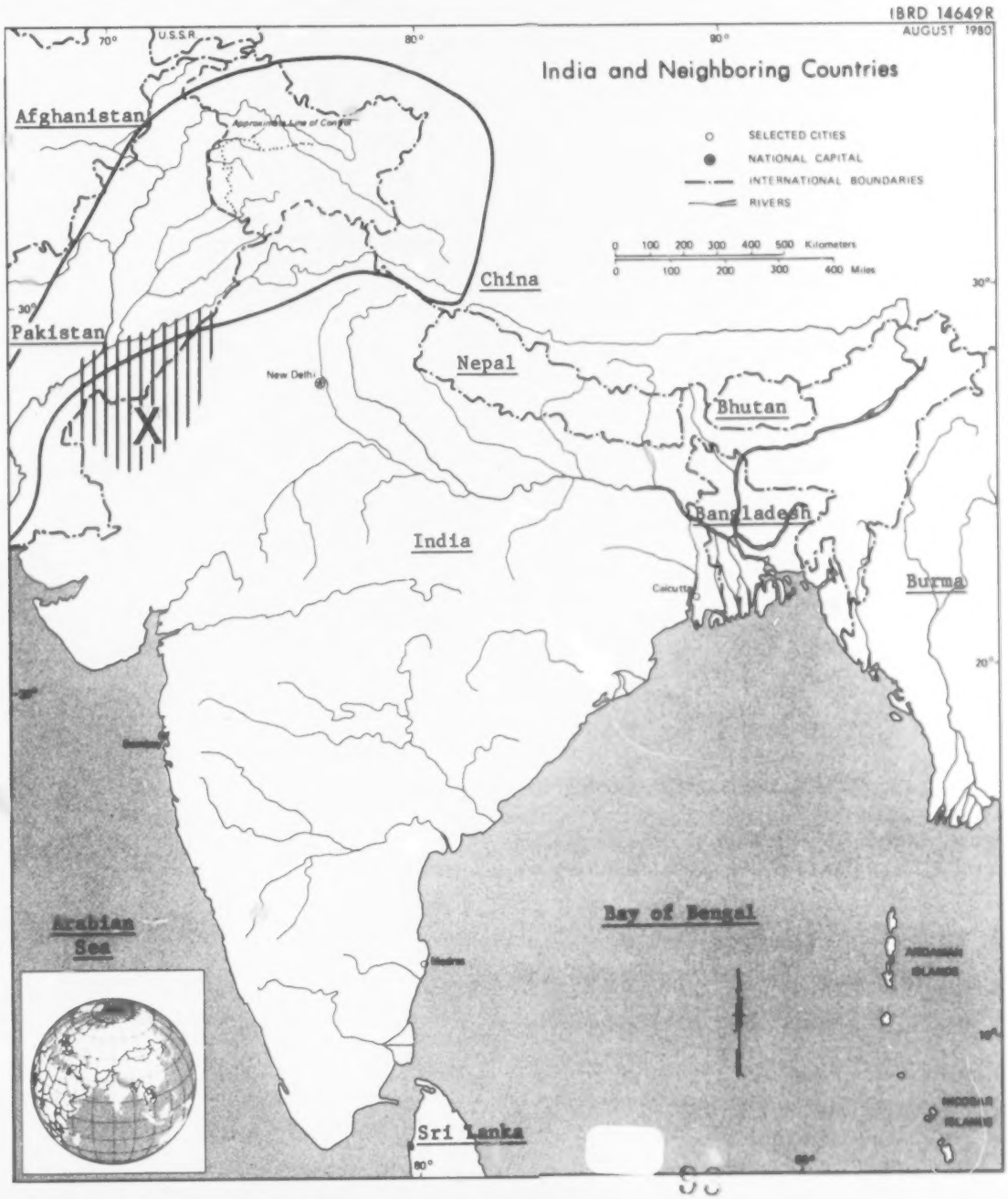
Supplementary activity

* 8.2. Distribute Worksheet No. 12 and have students select an additional activity.

Lesson 8 TEST

Instructions for grading Worksheet No. 11

Part One (14 points)



Lesson 8 TEST

Part Two (20 points)

1.	b	11.	a
2.	b	12.	c
3.	c	13.	b
4.	b	14.	a
5.	c	15.	c
6.	b	16.	b
7.	a	17.	c
8.	c	18.	a
9.	a	19.	b
10.	c	20.	a

Part Three (10 points)

1. One of each of the following:
   a. building roads, modernizing railroads, building ports
   b. building factories
   c. increasing irrigation, training farmers
   d. building schools, training teachers, improving water systems, improving sanitation facilities, increasing health services

2. Three of the following:
   - canal lining
   - paving roads
   - planting trees
   - constructing village wells
   - levelling dunes, lining watercourses
   - distributing fertilizer
   - reorganizing a bureau and creating 2 new bureaus in the Department of Agriculture in Rajasthan

3. Two of the following:
   - Incomes of poor farmers in Rajasthan have increased.
   - There are more jobs for poor farmers and people who have been unemployed.
   - Better roads enable poor people to get to markets, schools, and health centers.
   - People in Rajasthan are growing more food for themselves.
   - Food grown in Rajasthan is being transported to other parts of India.

Lesson 8 TEST

Part Four (20 points)

Good papers would make many of the following points:

Living conditions before the canal projects

- lack of rainfall
- hard work on poor land
- low agricultural output
- low income
- poor health
- frequent hunger
- poor housing

Living conditions after the canal projects

- rising income
- reliable water supply
- adequate food
- improved housing
- better transportation to markets, health clinics, and schools
- more jobs

Grading

Part One ----	14 points
Part Two ----	20 points
Part Three --	10 points
Part Four ---	20 points
	64 points

Suggested scale

64 - 58 --- A
57 - 51 --- B
50 - 45 --- C
44 - 38 --- D
37 -------- F

NARRATION FOR FILMSTRIP: WHAT HAPPENS WHEN A DESERT BLOOMS

(Time: 15:30)

Focus and start sound

1.	TOWARD A BETTER WORLD World Bank Educational Materials	(Music)
2.	Portrait of a woman	-----
3.	Portrait of a man	-----
4.	Portrait of a boy	First Voice These are the people of Rajasthan...
5.	Portrait of a girl	-----
6.	Portrait of a woman	-----
7.	Portrait of a man	-----
8.	Pushkar fair	...and this is the land of Rajasthan.
9.	Desert landscape	-----
10.	Map 1. India and surrounding countries	Rajasthan is in the northwestern part of India. It is one of India's largest states.
11.	Map 2. Northwestern India	More than a third of Rajasthan lies in a desert, which extends westward into Pakistan.
12.	Goats and goatherd	For centuries, people have lived in that desert as many live there today, herding sheep and goats.
13.	Boy and goats	Their herds provide milk and wool, usually just enough to meet the needs of a single family, occasionally enough to have a little extra to sell.
14.	Boy and cattle	Some families own cattle that graze on the sparse grasses and bushes of the desert.
15.	Women sifting grain	Some families grow wheat, but they usually harvest only enough to feed themselves.

16.	Thatch house	For centuries, people have lived on the desert of Rajasthan in houses made of straw.
17.	Village	Others live in small villages that have grown up around wells.
18.	Women and children carrying water	Women and children get water at the village well and carry it to their houses.
19.	Woman approaching house	Their houses are made from the sand, mud, and bushes of the desert.
20.	Woman threshing	Farming methods are simple.
21.	Camel threshing	Camels are often used for some of the work.
22.	Farmers in unirrigated field	Because most of the land produces very little, most people in Rajasthan are very poor.
23.	Farmer irrigating a field	But others live on land that looks very different--because it is irrigated. When the desert of Rajasthan is irrigated, it blooms.
24.	Title slide: WHAT HAPPENS WHEN A DESERT BLOOMS	This is a story of what happens when a desert blooms...what happens to the land...and what happens to the people who depend on it. (End music)
25.	Map 3. Northwestern India with Indus R. and tributaries	<u>Second voice</u> Water to irrigate northwest India and Pakistan comes from the Indus River and its tributaries which rise in the Himalayas and flow southward a thousand miles to the Arabian Sea.
26.	Headwaters of the Indus	People have been irrigating with water from the Indus and its tributaries for more than four thousand years. One of the great urban civilizations of antiquity arose here.
27.	Dam	In recent times, dams have been built to regulate the flow of water. These dams, and the canals leading from them...

28.	Canal	...supply life-giving water to an irrigation system that covers thousands of square kilometers of land.
29.	Map 4. Rajasthan, Punjab, Indus and Sutlej Rivers	But no rivers flow through Rajasthan. The government of Rajasthan wanted to build an irrigation system in the early 1950s. It got permission from Punjab, a neighboring state, to build a canal that would carry water from the Sutlej River across Punjab to Rajasthan.
30.	Feeder canal	The canal across Punjab was called a "feeder canal." No water was removed from it in Punjab. Its sole purpose was to "feed" water to Rajasthan.
31.	Rajasthan Main Canal	Water flowed from the feeder canal into the Rajasthan Main Canal at the the Rajasthan border. From the main canal, water flowed into a series of other canals, each a little smaller than the last, until it reached farms.
32.	Farmers in unirrigated field (Slide 22)	Land that once was parched...
33.	Farmers irrigating	...began to look like this.
34.	Field of pulses	Farmers could grow vegetables...
35.	Field of wheat	...wheat...
36.	Field of cotton	...and cotton. Many farmers came to live in the area irrigated by the canal system, and some of them prospered. (Pause) But by the early 1970s, the canals had deteriorated and were leaking badly.
37.	Unirrigated land	Many farms did not receive water regularly. So the government of India and the Government of Rajasthan decided to repair the Rajasthan canal system and develop the area it served.
38.	Officials in a meeting	To help pay the costs, the government of India applied for a loan from the World Bank, which lends money to developing countries.

39.	Officials in a meeting	Representatives of the government of India, the government of Rajasthan and the World Bank worked together to plan a project that would develop the Rajasthan Canal area.
40.	RAJASTHAN CANAL COMMAND AREA DEVELOPMENT	First Voice The new project was called the Rajasthan Canal Command Area Development Project. A "command area" is the area a canal irrigates.
41.	1. To increase the incomes of farmers. 2. To increase agricultural production.	The project had two goals. The first was to help farmers earn more income. The second was to help them produce more on their land. (Pause) To achieve these goals, the canal system had to be improved.
42.	Diagram of canal system	This diagram shows the canal system. The feeder canal carries water across Punjab to the Rajasthan Main Canal. From the main canal, water enters the branch canals. The water then passes into distributary canals, then into watercourses, and finally into field channels on farms.
43.	Rajasthan Main Canal	The feeder canal and the Rajasthan Main Canal were in good condition.
44.	Slide 42 with arrow pointing to branch canal	But the branch canals had to be lined with two layers of tile so that they would not leak.
45.	Branch canal	Repairing the four branch canals was a massive task.
46.	Branch canal without water	Water had to be diverted, and silt had to be removed. After that was done, tiles could be laid.
47.	Men making tiles	Small tile factories were set up along the branch canals. People who lived nearby were hired to make tiles from sand and other local materials. Tiles were then fired in kilns....
48.	Camel drawing loaded wagon	...loaded onto wagons...
49.	Construction site	...and carted to the canals. Many unemployed people got temporary jobs working on the canals.

50.	Man laying tile	-----
51.	Tile factory	After the tiles had been laid in one section of a branch canal, the tile factories were taken down and reassembled farther along the canal.
52.	Slide 42 with arrow pointing to distributary canal.	The distributary canals had to be lined, too. Although they were smaller than branch canals, they also needed two layers of tile.
53.	Man and woman working	The process was the same. Tiles were manufactured at small factories, carried to the construction site, and laid in place. Two layers of tile were installed on more than 900 kilometers of branch and distributary canals, nearly 600 miles.
54.	Slide 42 with arrow pointing to watercourse	In addition, nearly 6,000 kilometers of watercourses had to be lined--that's about 3,500 miles.
55.	Farmers working on watercourse	Groups of farmers worked together to line the watercourses that served their land. Only one layer of tile was needed, because watercourses carry less water than the other canals.
56.	Farmers digging field channel	When the watercourses were completed, farmers dug channels to lead water to their fields. Some farmers worked in teams.
57.	Farmer with oxen	Others used a plow drawn by oxen or camels.
58.	Farmer with tractor	A few rented tractors to dig the field channels.
59.	Water entering field	From these channels, water flows on to the fields.
60.	Irrigated field	In the foreground, vegetables are growing in an irrigated field. Beyond the vegetables, fields are ready for planting. In the distance are sand dunes. You can see where the irrigation ends. (Pause) Repairing the canals has been an important part of the Rajasthan Canal project, but there are other activities, too.

61. Earth-moving equipment	One of them is to level sand dunes to make more farmland. The new land is sold to farmers who own no land. They receive loans to help pay for it.
62. Road	Another project activity is to extend state roads and to pave roads that link villages to market towns. Four hundred twenty kilometers of roads, nearly 300 miles, are being improved.
63. Trees and road	Still another project activity is to plant trees in wide bands along the roads and canals to prevent sand from blowing onto them. The newly planted areas are called "shelter belts" and farmers can graze their animals there.
64. Village well	Part of the project is to modernize old wells like this one. For example, this storage tank will be covered, and the water will be filtered and purified. More than 100 village wells are being modernized in this way.
65. Farmers with extension	One of the most important project activities is to teach farmers how to use better farming methods. Specially trained people, called village extension workers, meet regularly with farmers to encourage them to learn better ways of planting, weeding, and harvesting their crops. Farmers also learn how to use better seeds and fertilizer. With better farming methods and irrigation, farmers can produce more.
66. Irrigated field	<u>Second Voice</u> What does it take to make a desert bloom? In Rajasthan, it has taken years of planning and effort. It has taken millions of dollars. It has taken the hard work of tens of thousands of people who have had an opportunity to create a better life. (Pause) What happens to these people when a desert blooms?
67. Farmers growing vegetables	With a regular supply of water and better methods of farming, the farmers of Rajasthan can grow more vegetables...

68.	Woman picking cotton	...more cotton...
69.	Man and woman harvesting wheat with traditional methods	...and more wheat. Most farmers harvest their wheat with traditional methods.
70.	Harvesting with a combine	A few rent modern machinery. (Pause)
71.	Camel-drawn wagon	Using newly paved roads, farmers can take their crops to market towns to sell them.
72.	Grain being dumped from a truck	At the market, farm products are unloaded. This is wheat.
73.	Piles of grain	The crop of each farmer is kept in a separate pile.
74.	Filled grain bags	Then it is loaded into bags which are transported to other parts of Rajasthan and India.
75.	Cotton	Cotton is unloaded in piles at the market, too,...
76.	Cotton being trampled	...and trampled to make it compact. Then it is weighed and shipped to textile mills.
77.	Camel loaded with produce	Because farmers can produce more, they can earn higher incomes. They can buy better seeds and fertilizer. Then they produce even more.
78.	House	They can build sturdier houses.
79.	Women making chappattis	Their families can have more to eat, and better clothes.
80.	School	When the desert blooms, more children can go to school, because their parents have enough money to pay school fees and buy school clothes.
81.	Health clinic, mother and baby	Because the roads are better, more people can get to health clinics.
82	View of Calcutta	People in other parts of India have more to eat because food grown in the Rajasthan is shipped to them.

83.	Map 5 Major rivers of India	The Rajasthan Canal project is only one of many irrigation projects in India. Water from all of India's principal rivers is being used for irrigation.
84.	Unirrigated land	(Music) First Voice But millions of farms in India still do not have enough water, and millions of people still are hungry.
85.	Canal under construction	That is why India needs to build many more canals...
86.	Road	...and improve many more roads...
87.	Extension worker	...and teach many more farmers new farming methods. All this will take a lot of time, money, and effort.
88.	Farmer irrigating (slide 23)	But by investing more time, money, and effort, the living conditions of many more farmers in in the rest of India will improve, just as living conditions have improved in Rajasthan because of what happens when a desert blooms.
89.	Slide 23 with overlay Produced at the World Bank Washington, D.C. Copyright IBRD/World Bank 1980	(End music)

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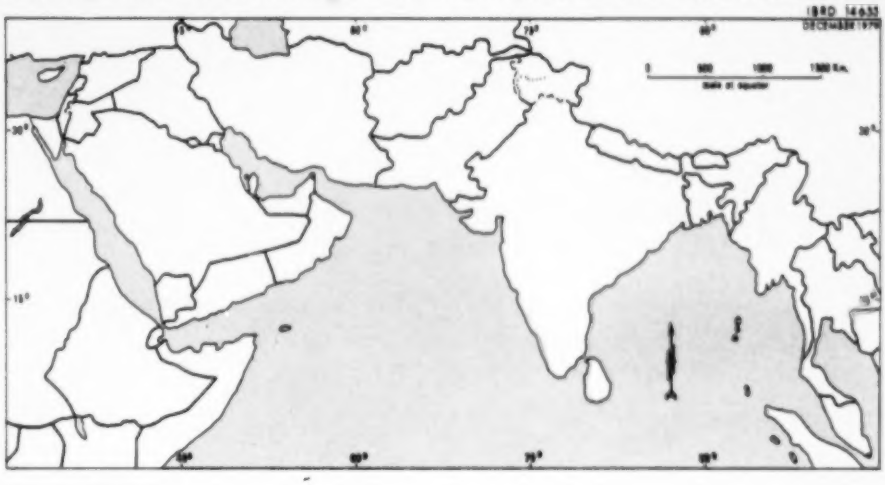
WORKSHEETS

- By cutting the worksheets along the line of dashes, they can be removed for duplicating without damaging the Teaching Guide.
- Worksheets preceded by an asterisk are for highly motivated students.
- Teachers should read each worksheet carefully before using it to determine whether it is appropriate for his/her class.

	Worksheet No. 1.	Lesson 1.	What Do You Know About the Indian Economy?
	Worksheet No. 2.	Lesson 1.	India and Neighboring Countries
*	Worksheet No. 3.	Lesson 2.	A Meeting of the India Consortium
	Worksheet No. 4.	Lesson 3.	While Your Read
	Worksheet No. 5.	Lesson 3.	How Good Are You at Locations?
	Worksheet No. 6.	Lesson 4.	The Canal System of the Rajasthan Canal Project
	Worksheet No. 7.	Lessons 4 and 5.	Project Components and Costs
*	Worksheet No. 8.	Lesson 5.	Meeting with the Ministry of Finance of the Government of India
*	Worksheet No. 9.	Lesson 5.	How Much Will Farm Incomes Rise?
	Worksheet No. 10.	Lessons 6 and 7.	Graphing Changes in Agricultural Production
	Worksheet No. 11.	Lesson 8.	Test
*	Worksheet No. 12.	Lesson 8.	Additional Activities

WHAT DO YOU KNOW ABOUT THE INDIAN ECONOMY?

1. The map below shows part of Asia. Draw a circle around the Indian subcontinent.



2. Indicate by a check the countries that have boundaries with India.

_____ Pakistan	_____ China	_____ Bangladesh
_____ Thailand	_____ Iran	_____ Indonesia

3. In comparison with the United States, the area of India is (check one):

_____ bigger	_____ smaller	_____ about the same

4. India's population is (check one):

_____ about 300,000,000	_____ about 600,000,000	_____ 900,000,000

5. In comparison with the United States, India's population is (check one):

_____ about the same size
_____ nearly three times that of the United States
_____ nearly ten times that of the United States

6. Most Indians make their living as (check one):

_____ factory workers	_____ business men and women
_____ farmers	_____ government officials

7. In comparison with the average American, the average person in India (check all that apply):

_____ has less educational opportunity
_____ eats slightly less food
_____ is more likely to be ill

8. If all the goods and services produced in India in 1978 had been divided equally among its people, the value of each person's share would have been:

_____ about $50

_____ about $200

_____ about $500

9. India has (check one):

_____ few natural resources

_____ a lot of agricultural land but no mineral resources

_____ both agricultural and mineral resources

10. India has (check one)

_____ little industry

_____ only few textile mills

_____ a lot of modern industry

11. India imports (check all that apply):

_____ food grains

_____ oil

_____ industrial raw materials

12. India exports (check all that apply):

_____ machinery

_____ textiles

_____ handicrafts

13. Most Indian farmers (check one):

_____ do not own the land they farm

_____ produce only enough to feed their families

_____ produce enough to make a decent living.

14. To improve living conditions in India (check one):

_____ little is being done because there is so much poverty

_____ new industries are being set up

_____ many different things are being done.

15. India is poor because (check one):

_____ it has few resources and cannot produce much

_____ it does not produce enough for its rapidly growing population.

_____ its people do not work hard.

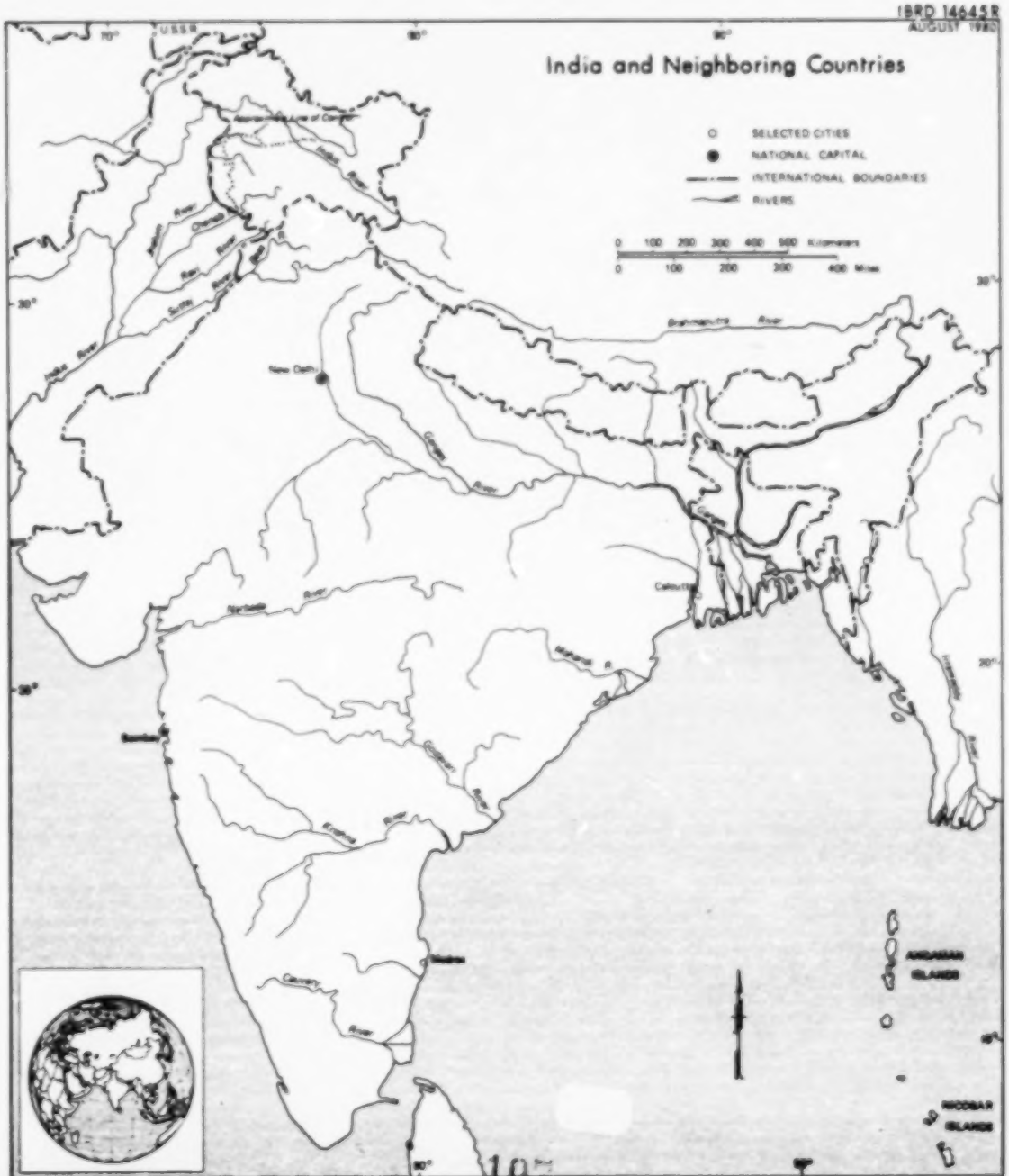
Worksheet No. 2
Lesson 1

(Name) _____

INDIA AND NEIGHBORING COUNTRIES

Using the map on the back cover of the Economic Summary: India for reference, label the following places on the map below.

Arabian Sea	Bangladesh	China	Pakistan
Bay of Bengal	Bhutan	India	Sri Lanka
Afghanistan	Burma	Nepal	



A MEETING OF THE INDIA CONSORTIUM

Many developed countries and many international institutions provide loans or grants of money to India to assist it in economic development. Their representatives meet each year with representatives of the Indian government to review economic conditions in India and to coordinate their efforts. The group is called the India Consortium. Here is a list of its members:

European Economic Community (EEC)
Organization for Economic Cooperation and Development (OECD)

International Monetary Fund
United Nations Development Program
World Bank
Austria
Belgium
Canada
Denmark
France
Germany
India
Italy
Japan
Netherlands
Norway
Sweden
Switzerland
United Kingdom
United States

You are to represent two of the institutions or countries (or one of each) at the next meeting of the India Consortium. Seven development activities are on the agenda for discussion at the meeting.

1. Modernize more railroads
2. Build more plants to produce fertilizer
3. Build more small-scale factories in rural areas to produce cloth for export
4. Train more farmers in modern farming methods
5. Build more schools and train more teachers
6. Train more health workers to work in villages and urban slums

The following questions will be raised at the meeting of the Consortium:

1. How should these activities be ranked in importance?

2. How does each contribute to economic development in India?

3. Should all these activities be undertaken at once on a small scale, or should money be concentrated on a single activity?

4. If there is money to support only one activity, which would you choose? Why?

Make notes to guide you in discussing these question at the meeting of the Consortium.

AS YOU READ

Make brief notes to answer the following questions as you read pages 1-9 in The Rajasthan Canal Project.

1. What does the Thar Desert (the Great Indian Desert) look like?

2. Why has part of the desert area been important in the history of the Indian subcontinent?

3. Why was there disagreement between India and Pakistan after 1947 about the desert area?

4. List several ways of life that you would see if you visited Rajasthan.

5. What problems do people face in making a living on unirrigated land in Rajasthan?

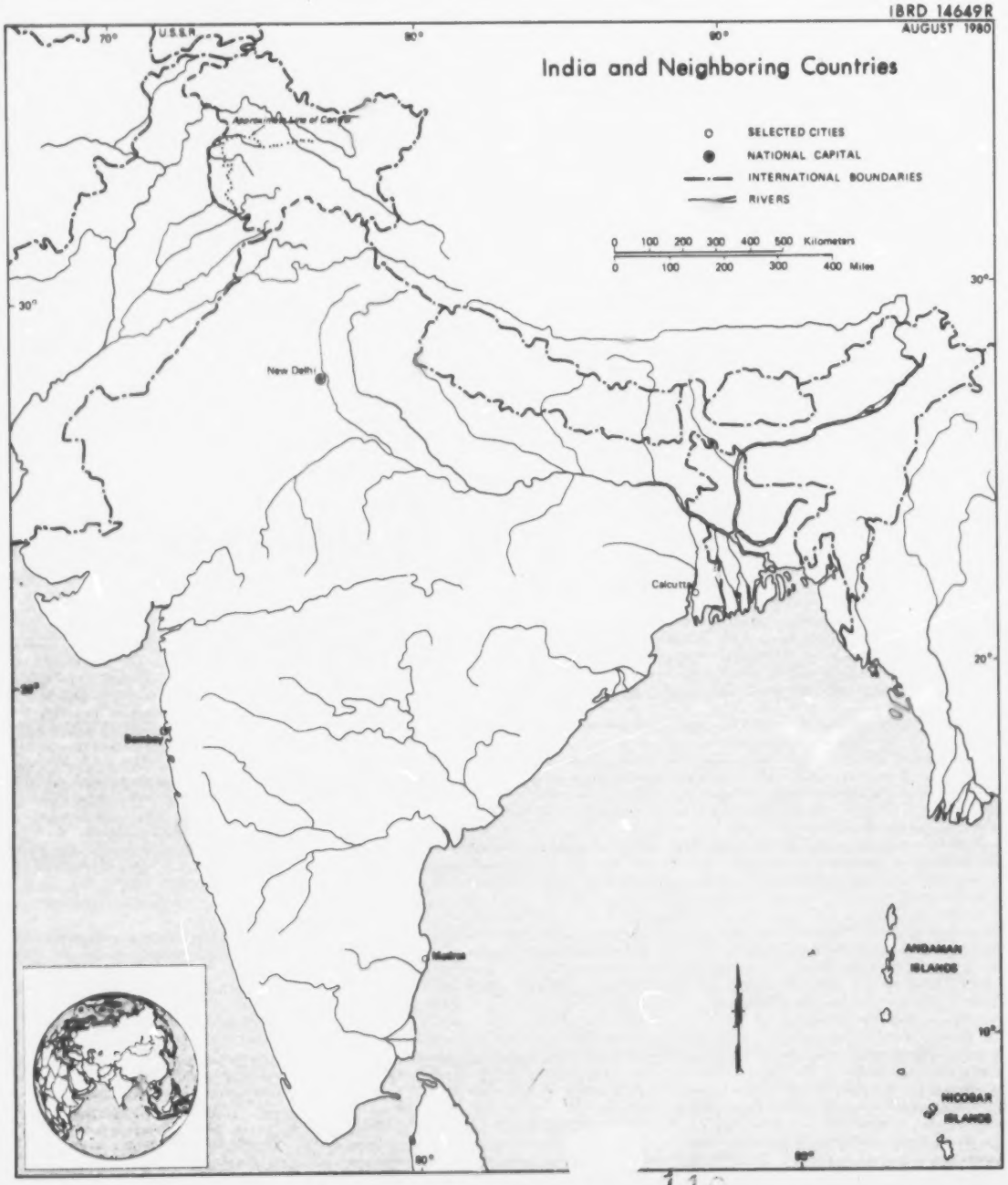
(Name) _____

HOW GOOD ARE YOU AT LOCATIONS?

1. Label the following on the map:

Arabian Sea	China
Bay of Bengal	India
Afghanistan	Nepal
Bangladesh	Pakistan
Bhutan	Sri Lanka
Burma	

2. Draw a line around the Indus River and its tributaries
3. Shade the approximate location of the Thar Desert (the Great Indian Desert).
4. Place a large "X" in the approximate location of Rajasthan.



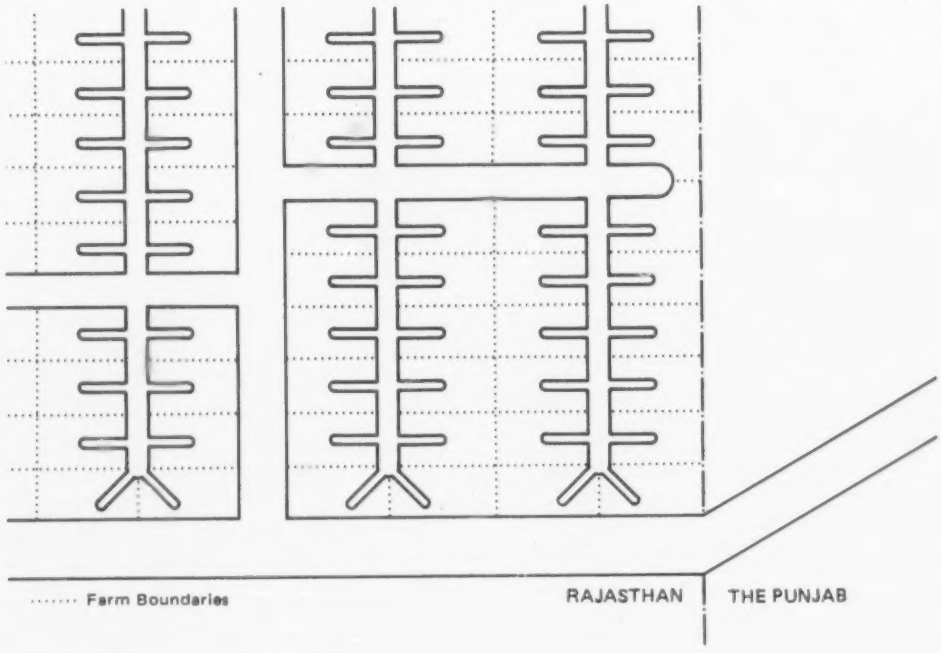
THE CANAL SYSTEM OF THE RAJASTHAN CANAL PROJECT

1. Part of the canal system of the Rajasthan Canal Project is shown in the diagram below. Using the diagram on page 11 of your book, label the following:

the Rajasthan Feeder Canal	distributary canals
the Rajasthan Main Canal	watercourses
a branch canal	field channels

2. Color the canals blue, or shade them lightly with your pencil.

THE CANAL SYSTEM OF THE RAJASTHAN CANAL PROJECT



3. In the space below, list in order the canals through which water flows in passing from the Sutlej River to a farm in Rajasthan.

PROJECT COMPONENTS AND COSTS

1. Answer the following questions.

   a. What was to be the total cost of the Rajasthan Canal Command Area Development Project in U.S. dollars? _____

   b. The World Bank was to lend 48 percent of the total. What was the amount of the loan in U.S. dollars?

   _____

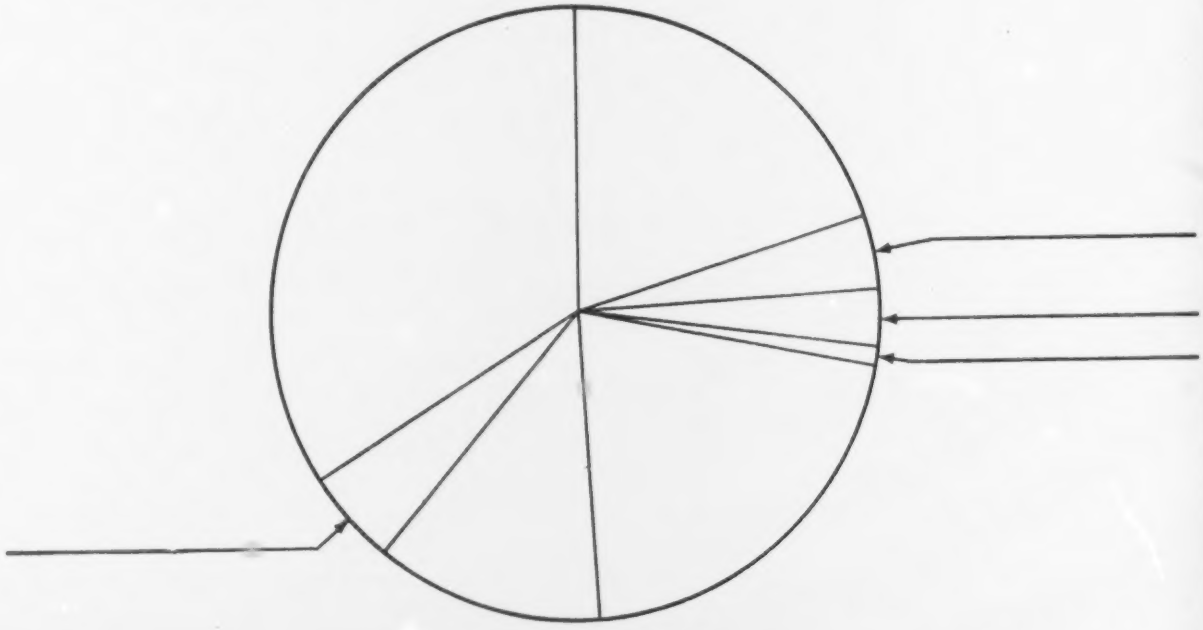
   c. The Indians were to pay 52 percent of the total. What was the amount in U.S. dollars? _____

   d. The exchange rate of Indian rupees in 1974 was U.S.$1 = 8 Indian rupees. How much was the Indian share of the cost of the project in rupees? (Multiply the U.S. dollar figure by 8 to get the rupee equivalent.) _____

   e. Who will pay the cost of the project in the long run?

   _____

2. The pie chart below represents the total cost of the second Rajasthan Canal project. The sections of the pie chart represent the cost of the project's components. Using Table 1 on page 21, label the sections of the pie chart.



3. To get a clearer idea of the cost of the Rajasthan Canal Command Area Development Project, answer the following questions.

   a. The school systems in the suburbs of Washington, D.C. enroll 100,000 to 125,000 students. Operating these school systems for a single year costs about $300,000,000. How many projects like the second Rajasthan Canal project could be paid for with this amount of money?

   _____

   b. An office building ten stories high in the heart of a major American city accommodates 1,400 people, a cafeteria, and parking space for 400 cars. The land on which it is built costs about $10,000,000. Construction costs are about $21,000,000. How many buildings of this kind could be built with the amount spent on the second Rajasthan Canal project?

   _____

   c. A 1980 Mercedes Benz (Model 280E) with four doors, air conditioning, and automatic transmission, costs $25,000. How many such cars could be purchased with the amount spent on the second Rajasthan Canal project?

   _____

4. Does the project seem to you to be expensive or not? Why?

MEETING WITH THE MINISTRY OF FINANCE OF THE GOVERNMENT OF INDIA

Officials of the government of India, the government of Rajasthan, and the World Bank planned the Second Rajasthan Canal project over a period of two years. As this period drew to a close, the plans for the project had to be approved by the Ministry of Finance of the Government of India.

You are an Indian official who has been involved in planning this project. You must meet with officials of the Ministry of Finance to describe the project. You know that the following questions will be raised:

1. Why is the project so complicated? Why is it not enough just to line the canals?

2. What reasons are there for the various components?

3. Can any components of the project be eliminated to reduce the cost of the project?

You know that officials at the Ministry of Finance want a good project in Rajasthan. But it is their job to spend carefully so there will be money for as many projects as possible throughout India.

You are to describe and defend one of the components of the project at a meeting of the Ministry of Finance. (Your colleagues will do the same thing for other components.) Choose one of the components described on pages 18-23 of The Rajasthan Canal Project. Outline the statement you will make about including this component in the project. Give at least two reasons for including it, and prepare to answer the questions you know members of the Ministry of Finance will ask.

HOW MUCH WILL FARM INCOMES RISE?

Persons who plan such projects as the Rajasthan Canal Command Area Development Project draw up farm budgets. They do so to answer the question: How much will project activities increase the incomes of farmers? A farm budget shows the income and expenditure of a typical farm family in the project area before, during, and after the project.

You are going to draw up a farm budget for the second Rajasthan Canal project, just as Indian economists and World Bank economists did in 1973 and 1974. Detach the chart on the last page of this worksheet and study it as you read the next four paragraphs.

The data in the chart are based on the following assumptions and estimates:

- a farm of 6 hectares (15 acres), fully irrigated
- a family of 8
- a loan of 20,000 rupees to purchase land
- a loan of 15,000 rupees to improve land.

Look at the left-hand column in the chart. Farm revenue is based on an estimate of the production of typical crops -- wheat, pulses (vegetables such as peas, beans and lentils), cotton, mustard (a source of vegetable oil), fodder for animals, and a few other things. The value of this estimated production is calculated to derive the figure for farm revenue.

Farm expenditure is based on the following estimates: a charge for water paid to the Canal Command Authority; the cost of hiring labor to help with planting and harvesting; interest on loans to buy seed and fertilizer; repayment of the loans for purchasing and improving land; and such miscellaneous expenses as veterinarian services and pesticides.

Net Family Income (farm revenue minus farm expenditure) is the estimated amount of money a typical farm family in the project area would have to spend in a year.

Directions

1. Read the chart carefully and explain how the farm income figures for 1974 and 1975 were derived. Write your explanation on the back of the chart.

2. Compute net family income for the other years in the chart.

3. Compute the increase in family income since 1974 for each of the years in the chart.

4. Convert the figures from rupees to dollars, using the exchange rate US$1 = Rs 8.

5. Compute the per capita income.

Questions for discussion

1. How many times will family income increase by 1980? by 1990? Would this increase be enough to make farmers want to participate in the project?

2. On the basis of the farm budget, do you think the second Rajasthan Canal project will raise the income of farmers sufficiently to justify its cost?

FARM BUDGET -- RAJASTHAN CANAL COMMAND AREA DEVELOPMENT PROJECT

	Year 0 1974	Year 1 1975	Year 2 1976	Year 6 1980	Year 11 1985	Year 16 1990
Farm revenue	Rs. 5,617	Rs. 9,556	Rs. 10,709	Rs. 16,080	Rs. 19,107	Rs. 21,114
Farm expenditure						
Water charges	150	150	150	192	192	192
Hired labor	0	480	520	685	885	1,090
Interest	0	95	130	190	190	190
Repayment of loan for land purchase	0	0	500	1,000	1,600	0
Repayment of loan for land development	0	1,500	1,500	2,625	0	0
Miscellaneous	150	300	300	300	300	300
Total	300	2,525	3,100			
Net family income	Rs. 5,317					

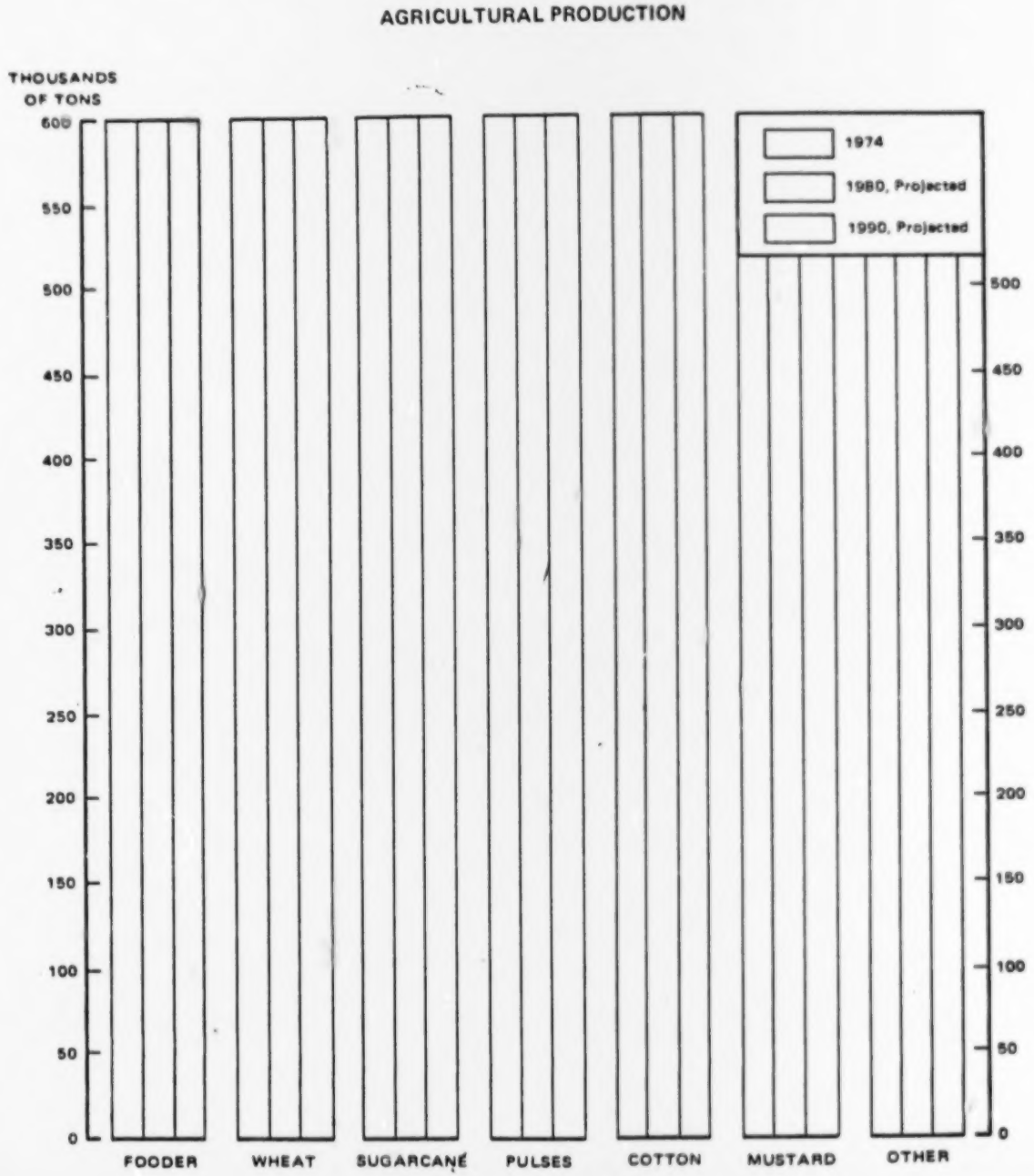
Increase in family income since 1974	-					

Family income, 1978 US$ (US$=Rs.8)						
Per capita income, 1978 US$ (family income assumes family of 8)						

Worksheet No. 9, page 3
Lesson 5

GRAPHING CHANGES IN AGRICULTURAL PRODUCTION

Using the data in Table 2 on page 35, make a bar graph showing agricultural production in the Rajasthan Canal command area in 1974 and projected production in 1980 and 1990.



TEST

(Name) _____

Part One

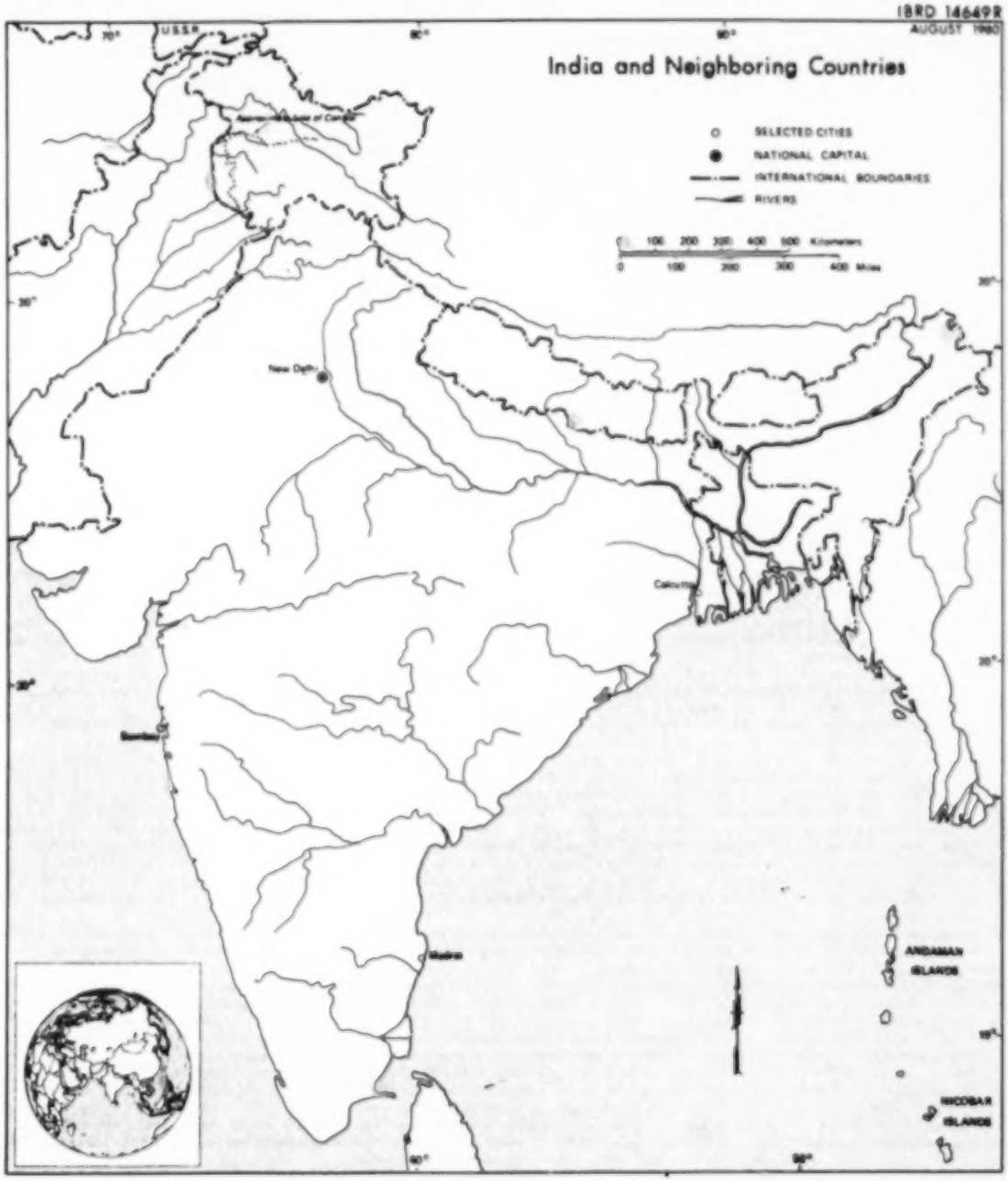
1. Label the following on the map:

Arabian Sea	China
Bay of Bengal	India
Afghanistan	Nepal
Bangladesh	Pakistan
Bhutan	Sri Lanka
Burma	

2. Draw a line around the Indus River and its tributaries.

3. Shade the approximate location of the Thar Desert (the Great Indian Desert).

4. Place a large "X" in the approximate location of Rajasthan



(Name) _____

Part Two

Read each sentence below. Then write the letter of the word or phrase that correctly completes it in the space at the left of the sentence number.

_____ 1. India's population in 1978 was approximately:
(a) 250,000,000
(b) 650,000,000
(c) 950,000,000

_____ 2. GNP per capita in India in 1978 was approximately:
(a) $50
(b) $200
(c) $500

_____ 3. For the Indian population as a whole, all the following are true except:
(a) adult literacy is low
(b) life expectancy is low
(c) the infant death rate is low

_____ 4. The resources on which India's economy is based include all the following except:
(a) coal and iron
(b) reliable rainfall
(c) petroleum and natural gas

_____ 5. All the following are true about India's farmers except:
(a) they comprise about three-quarters of the population
(b) most of them produce only enough to feed their families
(c) their production is limited by extreme summer heat

_____ 6. India exports:
(a) very little because it is a poor country
(b) a variety of manufactured and agricultural products
(c) petroleum and natural gas

_____ 7. India imports all the following except:
(a) foodgrains
(b) petroleum
(c) industrial raw materials

_____ 8. India has many modern factories which produce a variety of goods. However:
(a) its products are too low in quality to meet export standards
(b) its factories suffer from a chronic shortage of labor
(c) it is primarily an agricultural country that grows barely enough to feed its population.

_____ 9. Most of the money to pay for economic development in India comes from:
(a) the Indians themselves
(b) the governments of foreign countries
(c) international institutions

(Name) _____

_____ 10. To improve the living conditions of the Indian people, India is doing all the following except:
(a) building factories to provide needed goods and more jobs
(b) improving health services and increasing educational opportunities
(c) encouraging people to move from the countryside to the cities.

_____ 11. India's population is:
(a) much larger than that of the United States and increasing much more rapidly
(b) about equal to that of the United States but increasing much more rapidly
(c) much larger than that of the United States and increasing at about the same rate.

_____ 12. India is a poor country because:
(a) it has few natural resources
(b) its economy is old fashioned
(c) it does not produce enough to meet the needs of its growing population

_____ 13. The desert area in the northwestern part of the Indian subcontinent has been important throughout the history of the subcontinent because:
(a) an ancient civilization grew up there
(b) parts of it have been irrigated
(c) it has not been as densely populated as other parts of the subcontinent.

_____ 14. Canals could not be built in Rajasthan until agreements about sharing water had been made by all the following except:
(a) the governments of Great Britain and India
(b) the governments of India and Pakistan
(c) the governments of Rajasthan and Punjab

_____ 15. The governments of India and Rajasthan built the Rajasthan Canal for all the following reasons except:
(a) to enable poor farmers to earn more on their land
(b) to increase the production of food
(c) to stimulate migration to the countryside from urban areas

_____ 16. Twenty years after it was built, the Rajasthan Canal:
(a) supplied adequate water to most farmers in the area
(b) supplied water to some farmers but not to others
(c) had ceased to operate

_____ 17. All the following are helping to pay for the Rajasthan Canal Command Area Development Project (the second Rajasthan Canal project) except:
(a) the government of India
(b) the government of Rajasthan
(c) the government of the United States

(Name) _____

_____ 18. The second Rajasthan Canal project cost approximately:
(a) $175,000
(b) $175,000,000
(c) $750,000,000

_____ 19. All the following are happening as a result of the Rajasthan Canal project except:
(a) agricultural production is increasing and the incomes of farmers are rising.
(b) the population of the area is declining
(c) surplus agricultural products are being shipped to other parts of India

_____ 20. When the second Rajasthan Canal project began, it was necessary to:
(a) improve old canals that did not function well
(b) build an entirely new canal system
(c) train farmers to use the existing canal system

Part Three

1. In the spaces at the left, there are four activities in which India is engaging to advance its program of economic development. In the spaces at the right, give a specific example of each activity.

a. Improving transportation	
b. Increasing industrial production	
c. Increasing agricultural production	
d. Assisting the poorest people	

2. List three components of the Rajasthan Canal Command Area Development Project (the second Rajasthan Canal project).

_____

_____

3. Two of the goals of India's sixth development plan are to assist the poorest people, and to increase agricultural production, especially of food. State three ways in which the Rajasthan Canal project advances these goals.

_____

_____

_____

_____
(Name)

Part Four

Choose one of the following.

1. Write a "before and after" paper about the Rajasthan Canal project. Organize the paper in two sections. In the first section, describe living conditions in the unirrigated part of Rajasthan before the first project began. In the second section, describe living conditions in the irrigated part of Rajasthan today.

2. Pretend that you are Ranjit's and Sitadevi's 16-year-old son, born shortly after they moved to their farm near Bijeyanagar, or their 15-year-old daughter born the following year. You have lived all your life in the Rajasthan Canal area, and you have seen many changes.

   Describe the changes you have seen. Compare your life now with your parents' lives when they were your age.

ADDITIONAL ACTIVITIES

1. Write a brief history of the Rajasthan area referring to the events mentioned on page 4 of The Rajasthan Canal Project.

2. Make a study of irrigation. Discuss the structures that make up an irrigation system, and describe a specific system (for example, the Nile valley, the Tennessee valley basin, the Indus River basin).

3. Write a paper based on option 2 in Part Four of Worksheet No. 11.

4. Read Nectar in a Sieve by Kamala Markandaya (New York: New American Library; a Signet Book; 1954; 190 pp.; $1.25). The book tells the life story of a rural Indian woman. Write a report of the book or give an oral report to the class.

5. Working as a team of three or four, plan an interview of Ranjit and Sitadevi by a news analyst for All India Radio. The purpose of the interview is to determine how Ranjit and Sitadevi view the many ways their lives have changed as a result of the Rajasthan Canal project. Have there been too many changes of too many kinds? Do they feel they are better off now or not?

   The interview should touch on changes in their income, food supply, health and housing, and in their relationships and values. During the interview they should describe the choices they have had to make and the risks they have had to take. Conduct the interview for the class.

6. Conduct a debate on the following proposition:

   Resolved: Economic development damages people because it destroys their way of life.